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Cost Analysis for Building Removal at Fort Chaffee, Arkansas

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Construction Engineering Research Laboratory

Foreword

This study was conducted for Headquarters, Department of the Army, Assistant Chief of Staff for Installation Management, under a Military Interdepartmental Purchase Request (MIPR) 0ACERB3001, entitled "Technical Reviews for Base Realignment and Closure (BRAC) Installations," dated 1 October 1999. Project liaisons for the Army BRAC Office – Pentagon were Susan Bauer and Mark Jones, DAIM-BO.

The work was performed by the Facilities Maintenance Branch (CF-F) and the Energy Branch (CF-E) of the Facilities Division (CF), Construction Engineering Research Laboratory (CERL). The CERL Principal Investigator was L. Jerome Benson, CF-E. The technical editor was Gordon L. Cohen, Information Technology Laboratory – Champaign. Mark W. Slaughter is Chief, CF-F, Larry Windingland is Chief, CF-E, and L. Michael Golish is Chief, CF. The Technical Director of the Installation Operations business area is Gary W. Schanche, CV-T. The Acting Director of CERL is William D. Goran.

CERL is an element of the Engineer Research and Development Center (ERDC), U.S. Army Corps of Engineers. At the time of publication, the Director of ERDC was Dr. James R. Houston and the Commander was COL James S. Weller.

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1 Introduction

Background

In 1995 the Defense Base Realignment and Closure (BRAC) Commission recommended the permanent closure of Fort Chaffee, AR, and the installation was closed as recommended in September 1997. A Local Redevelopment Authority (LRA) was subsequently established to develop a set of recommendations for reutilization and development of the property. The LRA, known as the Fort Chaffee Redevelopment Authority (FCRA), has prepared its recommendations and submitted them to the Department of the Army in a document entitled *Comprehensive Reuse Plan for Fort Chaffee* (hereinafter referred to as the "Reuse Plan"). The Reuse Plan comprises a portion of FCRA's application for an Economic Development Conveyance (EDC) that would transfer ownership of the Fort Chaffee real property from the Federal government to the private sector for commercial use.

More than 600 World War II (WWII)-era temporary wood frame buildings still stand on Fort Chaffee, comprising about 2 million square feet (SF) of floor space. Because the presence of these buildings would interfere with property development, removal of these structures is of the utmost importance to FCRA. The Reuse Plan calls for the demolition of these 600-plus buildings. Consequently, the FCRA and the Army have explored various alternatives for removing the buildings as quickly and economically as feasible. The Construction Engineering Research Laboratory (CERL), an element of the U.S. Army Engineer Research and Development Center (ERDC), was tasked to support this effort.

Objectives

This report summarizes a cost analysis of various scenarios for removing approximately 600 WWII-era temporary wood frame buildings from the grounds of Fort Chaffee. The analysis addressed the following:

1. demolition of all buildings and disposal of debris in the municipal landfill at Fort Smith, AR

2. demolition of all buildings and disposal of debris by incineration on the Fort Chaffee property
3. procedures that FCRA can consider to reduce the cost of removing and disposing of the buildings, and to reduce adverse environmental effects of the demolition.

Approach

The economic analysis assumptions and methods used in the study are explained in detail throughout the text. The methods used for collecting data on the building inventory, site conditions, and demolition and salvage costs are described as follows.

Building Inventory and Site Conditions

The facility types comprising the largest portion of the total WWII wood frame building inventory were identified, and representative examples were selected for an onsite survey. A detailed survey of 18 buildings was conducted, collectively representing over 75 percent of the total floor space of the affected facilities. Construction documents were available for other building types that were not surveyed onsite. The Base Transition Team (BTT) supplemented this information with a detailed survey of asbestos-containing materials (ACM) in the affected inventory, and CERL used these data to develop a quantity takeoff for ACM removal and disposal. No other hazardous materials survey was conducted for this analysis.

Price Data

Price data were obtained from as many sources as could be gathered during the study period. Specific sources are cited in Chapter 3, “Demolition Cost Estimate,” and Chapter 4, “Cost-reduction Potential.”

Demolition cost estimates were compiled from Army Corps of Engineers cost estimating databases, commercial cost estimating data sources, historical data from Fort Chaffee, discussions with local contractors, references from the Arkansas Department of Environmental Quality (ADEQ), and discussions with Corps of Engineers personnel at Little Rock, Tulsa, and Mobile Districts. Unit prices for demolition activities (i.e., cost per square foot of building) are provided in databases and published sources. As a basis for comparison, demolition activities were also estimated using equipment and labor resources assigned to the various tasks. Demolition cost models previously developed by CERL for BRAC EDC

applications were also used as a basis of comparison. Costs for moving and relocating buildings were compiled from local house moving contractors.

Unlike construction cost-estimating data, published price data for salvage and deconstruction activities is extremely limited. There is some case study experience that provides a limited amount of data. Case study data were compiled from deconstruction pilot projects conducted at Army BRAC installations, the U.S. Department of Housing and Urban Development, and the National Association of Home Builders. The University of Florida Center for Construction and Environment provided case study data from seven deconstruction projects. Deconstruction and salvage costs varied among projects, although they were fairly consistent case by case. Average square foot unit costs for deconstruction and salvage were compiled. Task-by-task costs were also estimated for generic wood frame WWII-type buildings and the Fort Chaffee buildings. These estimates used unit costs for the various tasks. A square foot unit cost was then estimated for the Fort Chaffee buildings.

Salvage values were compiled from local sources, used building material exchanges, Habitat for Humanity (HfH) Re-Stores, and discussions with researchers — primarily in the wood products fields. A market for used building materials is emerging, but salvage values tend to vary considerably from area to area depending on regional construction market conditions and other economic factors.

For the reasons stated above, cost estimation methods for deconstruction and salvage projects are imprecise. Actual costs encountered for a specific type of project can vary among locations, and may also vary at the same location over time. Therefore, wherever firm and consistent sources of cost data were not available, a more conservative approach to cost estimating was taken in order to avoid underestimating project costs.

Scope

From April through August 2000 CERL presented interim findings and analyses to the project sponsor and various stakeholders for review and comment. Groups that were briefed or consulted during that period included the FCRA, the Forest Products Laboratory, the University of Florida Center for Construction and Environment, the Austin, TX, and Fort Smith, AR, HfH affiliates, the Office of the Principal Deputy Assistant Secretary of the Army [Installations & Environment], the Environmental Protection Agency (EPA), the Department of Transportation, Throughout that period new information relevant to this study

Throughout that period new information relevant to this study emerged, mostly involving proposed EPA regulations, state environmental policy, and salvaged lumber recovery rates and value. The majority of this final report reflects earlier findings and analyses presented to the FCRA, but updated information is also provided and noted in the body of the text.

This study focuses only on the removal of buildings. Roads, pavement, utilities, and other infrastructure items were not included, except for a few incidental non-building structures.

The demolition and disposal cost analysis represents a budget-level projection of expenses that FCRA, as property owner, is likely to incur when contracting for building removal services. The analysis presented here is not intended to represent a detailed cost estimate or project-level specifications. Budget-level estimates, based on square foot or parametric-type data, are generally considered accurate to within plus-or-minus 20 percent. However, the quality and detail of data obtained for this analysis should provide a narrower margin of error.

The cost impacts of disposal alternatives presented here were developed solely for purposes of comparing those alternatives. These projections are not intended to be used as refined project-level cost estimates.

Units of Weight and Measure

U.S. standard units of measure are used throughout this report. A table of conversion factors for International System (SI) of units is provided below.

SI conversion factors		
1 ft	=	0.305 m
1 sq ft	=	0.093 m^2
1 cu yd	=	0.764 m^3

2 Description of the Fort Chaffee Buildings

Building Inventory

This estimate is based on 638 buildings, totaling 2,533,895 SF. These buildings include barracks, administrative, training, mess facilities, morale/welfare/and recreation facilities, vehicle maintenance, warehouse and storage, and medical. Miscellaneous structures such as incinerator buildings and swimming pool are also included. Different inventories suggest slightly different numbers of buildings and area, although these discrepancies are minor.

Appendix A provides a building inventory by facility type and square foot total.

Building Description

Virtually all of these buildings are wood frame construction, built on reinforced concrete piers, slabs on grade, or combinations thereof. Roughly two-thirds of the building area consists of light frame (i.e., dimension lumber) construction, and are typically barracks, mess, administration, training, and operations type buildings of 3000 to 5000 SF in area. With the exception of roughly 160 two-story barracks, all light frame buildings are one-story (Figures 1 – 4). The remaining buildings are longer-span, open-bay warehouses or maintenance buildings, plus some chapels and recreation buildings, built with columns and trusses (Figures 5 – 8). Some timber members are used in larger buildings either as beams or in truss assemblies. Buildings are generally of open interior configurations. There is relatively little material used for interior configurations. There is relatively little interior partitioning. Some buildings have a concrete topping placed over floor construction.

There is some masonry present in the buildings, mostly brick chimneys in the barracks and vehicle maintenance buildings. Portions of the medical complex buildings are built on brick piers or brick foundation walls. Some concrete masonry is used for covered walkways in the medical complex. There are two terra cotta incinerator chimneys roughly 70 ft high.

The vast majority of the buildings are in disrepair. However, with some exceptions (primarily the motor pool buildings) most appear to be structurally sound. Roughly 100 light frame buildings have been renovated with relatively new roofing, siding, and windows. Roughly half of those have renovated interiors, which include finishes, plumbing, heating, ventilating, and air-conditioning (HVAC), and electrical systems. Almost all of the longer span warehouse buildings have been re-roofed and re-sided (Figures 9 – 11).

All buildings are assumed to be contaminated with lead-based paint (LBP). All exteriors are painted. BTT personnel report that metal siding was applied over painted wood siding. Many, but not all interiors have been painted. However, virtually all floor and roof structural assemblies remain unpainted. Furthermore, many (up to roughly half) of the buildings have interior construction that has never been painted.

ACM are present in most buildings. Most of this material would have to be removed prior to demolition. Some number of fluorescent ballasts (potentially containing polychlorinated biphenyls (PCBs); and fluorescent tubes, thermostats, and switches (containing mercury) were observed. These would have to be disposed of in a controlled fashion.

Facility Characterization

Surveys were conducted to identify the construction type and configuration of the major building systems, and descriptions of materials and components present in the buildings. Certain conditions were also noted, primarily with regard to LBP contamination or other features relevant to removal and disposal. This survey was necessary to develop a reasonable take-off of materials' quantities, which are applied to both a demolition estimate and an assessment of salvage value.

The following were recorded with the buildings' survey.

- Foundation systems consisted primarily of reinforced concrete piers, slabs-on-grade, or combinations of the two. Some medical buildings had brick continuous wall foundations and/or piers.
- Plumbing equipment includes supply piping (primarily galvanized steel), drain/waste/vent piping (primarily cast iron), plumbing fixtures (cast iron and china), and drinking fountains.

- HVAC components include radiators (cast iron), heaters, sheetmetal duct-work, piping, boilers, furnaces, heat pumps, hot water heaters, and hot water storage tanks.
- Fire suppression piping was present in some buildings, primarily ware-houses.
- Electrical components included, switches and receptacles, circuit breaker panel boxes, fire detection and alarm panels, fuse boxes, main switches, equipment switches, lighting fixtures (fluorescent and incandescent).
- Roofing materials include asphalt shingles, single ply roofing, metal roofing, sheet metal flashing and trim, and galvanized steel roof vents.
- Roof framing includes columns supporting framing (6x6s and 8x8s), rafters (primarily 2x8s), trusses (fabricated mostly from 2x8s), timbers (mostly 3x8s, some heavy timber construction), and sheathing (1 in. board). With a few exceptions, roof framing remained unpainted.
- Interior construction includes partition framing (mostly 2x4s), wall finishes (mostly gypsum wallboard and 1 in. board), interior doors, ceiling finishes (gypsum board and suspended acoustical panels), and floor finishes (wood, resilient, and oxychloride). The majority of interior partitions and doors are painted. Interior surfaces of exterior walls (studs and sheathing) were painted in some buildings, but not all. BTT personnel report that fewer than half of the buildings are painted on the inside.
- Exterior walls include framing (mostly 2x6s, 2x4s in barracks) wood clap-board, metal, and transite siding, sheathing (1 in. board), personnel doors (wood and metal), metal overhead doors, windows (wood and aluminum-clad wood). All wood siding and the original wood doors and windows are painted, and the paint is generally peeling badly.
- Floor construction consists of columns supporting floor framing (6x6s) joists, beams, and band joists (primarily 2x10s and 2x12s), and sheathing (1 in. board). In some buildings, a chip- or fibrous-type underlayment was observed. Floor framing remains unpainted.
- Brick chimneys are present in barracks and motor pool buildings.
- Steel fire escape landings, ladders, and stairs are present in upgraded two-story barracks and unaccompanied officers' quarters (UOQ) buildings.

ACM included the following:

- some shingle materials
- some floor finishes
- boiler and pipe insulation
- heat shields around flues.

A detailed ACM survey was conducted previously, documenting the presence and quantity of ACM in each building. CERL used this survey as the basis for ACM quantities.

Building material and component quantities were taken off for the sample buildings, then extrapolated to the entire building inventory. A detailed building-by-building survey was not conducted for these materials. Therefore, these quantities must be considered somewhat approximate.

Appendix B provides total quantities of the building materials and components, and quantities of ACM and hazardous materials found in the buildings.

Figure 1. Dining halls.

Figure 2. Hospital buildings.

Figure 3. Administrative building.

Figure 4. Barracks buildings.

Figure 5. Typical barracks interior.

Figure 6. Warehouse.

Figure 7. Warehouse building roof trusses.

Figure 8. Timber construction.

Figure 9. Upgraded interior.

Figure 10. Upgraded administrative building.

Figure 11. Upgraded dining hall.

3 Demolition Cost Estimate

Demolition Method

It is anticipated that all of the buildings, both one- and two-story, can be demolished with a hydraulic excavator. Boilers, furnaces, and other large pieces of equipment would be removed from the building. No further disassembly would be performed. The excavator would rip the buildings down where they stand, then crush the debris. The debris would then be loaded in trucks, using a dozer and end-loader, for hauling. No larger or more specialized demolition equipment is anticipated. Slabs on grade would have to be broken and removed. It is anticipated concrete piers would be dug or extracted with the excavator.

Significant Elements of the Cost Estimate

This cost analysis represents a budget-level estimate of demolition and disposal costs that the FCRA, as the owner, is likely to incur when contracting for the building's removal. It should not be considered to be a cost estimate per se. Budget level estimates, based on square foot or parametric-type data, are generally considered accurate within plus-or-minus 20 percent. However, the level of information obtained for this project should narrow this range to some degree.

The scope of this cost analysis is confined to removing buildings and restoring the grade to existing contours for drainage. The estimate includes:

- disconnecting water, sewer, gas, and electrical service lines
- demolishing the buildings, loading debris, and hauling debris
- environmental controls, such as air monitoring and personal protection
- disposing of the debris by landfilling and on-site incineration (construction and operation of the incinerator site is included in that estimate)
- removing foundations (it would be impractical in most cases to remove foundations at grade, and abandon what was left below grade)
- removing some incidental non-building structures (concrete ramps, a swimming pool, incinerator chimneys, fencing, and miscellaneous appurtenances)

- filling excavated areas and grading to restore existing contours to drain
- seeding disturbed areas.

This cost analysis was developed to represent a contract cost, assuming the FCRA will contract for this service. Therefore, the estimate includes:

- general contract conditions (permits, fees, bonds, etc.)
- contingencies (different contingencies are applied to different features of the work, as different levels of uncertainty are present)
- project contingency
- general contractor overhead and profit (home office overhead, job overhead, and profit are considered as one factor).

Assumptions

Several assumptions were made in order to compile an estimate. They are:

- Gas, water, sanitary sewer, and electrical service would be terminated at each building. With perhaps a few exceptions, there is one service line for each utility for each building. Gas service, however, has already been terminated at the west area, and was never provided to the motor pool area. Sanitary service has already been terminated in the west area.
- All building structure and contents would be demolished, and all debris disposed of. Large equipment may be removed prior to ripping the building down, but it too would be disposed of. No salvage is considered in this estimate.
- All ordinary building debris would be accepted by the Fort Smith landfill. It is assumed the debris will pass the Toxicity Characteristic Leaching Procedure (TCLP) test.
- An agreement exists between the City of Fort Smith and the FCRA that would allow the FCRA to deposit shredded “clean” wood materials in the landfill at no cost. However, it would be extremely difficult to process wood debris to comply with the definition of “clean,” as defined in ADEQ solid waste regulations. Therefore, the prevailing Fort Smith landfill tipping fees are applied to all construction debris.
- Some ACM may remain in the buildings if they are demolished and the debris landfilled. Costs for removing and disposing of these materials, therefore, are not included in the landfilling alternative. All ACM and LBP would have to be removed if the debris is incinerated. Therefore, costs for removing and disposing of all ACM are included in the incineration alternative.

- Debris can be hauled to the Fort Smith landfill without traveling on public roads. Therefore, the estimate assumes large capacity trucks for hauling. If over-the-road vehicles are used for hauling, hauling costs will be greater than indicated by this estimate.
- The FCRA indicated concrete rubble could be stockpiled for future use. Therefore, a reduced hauling price is applied to concrete debris, and no landfill fee is applied. If this turns out not to be the case, disposal costs for concrete materials must be added to the estimate.
- A duration of 10 months was assumed for demolishing all facilities as one project. Actual duration can vary considerably, depending on the resources assigned. While some costs are time-dependent, varying the duration will not change the estimates appreciably.
- With an assumed 10-month project duration, the cost of buying blower equipment for incineration and renting the equipment are roughly equivalent. The purchase price is, therefore, included in the incineration estimate.

While not precise, this cost analysis is expected to be entirely reasonable. CERL researchers attempted to develop estimates in as thorough, realistic, and accurate manner as possible for the purposes. However, different assumptions, experience, data sources, approaches to the work, or opinion can result in a different cost. Where differences are identified, the cost estimates must be adjusted accordingly.

Price Data

The following sources were used to compile price data for the demolition estimate.

- U.S. Army Job Order Contract (JOC) (PDS99) Unit Price Book
- Tri Services TRACES Unit Price Book
- Historical data from Fort Chaffee demolition projects conducted under a JOC
- R.S. Means Building Construction Cost Data and Facilities Maintenance and Repair Cost Manual
- Local contractors discussions concerning unit prices and labor/equipment requirements and costs
- Prices solicited from hazardous material abatement contractors referred by the ADEQ
- U.S. Army Corps of Engineers (USACE) Little Rock, Tulsa, and Mobile District personnel discussions
- CERL demolition cost model used in reviewing BRAC EDC applications.

Square-foot prices and other parametric estimates were applied where possible. This method is appropriate for a budget level estimate. Furthermore, most price data provides only gross unit costs for demolition activities. Detailed construction estimates (i.e., government estimates) rely on this data as well. For some items (ACM removal as an example), detailed unit prices were obtained from a number of sources, and a total cost estimate developed for the project. These estimates were then pro-rated per unit, such as SF of building or cubic yard (CY) of debris.

As expected, prices for similar work items varied among sources described in the "Price Data" discussion, above. Where prices varied by a considerable amount, judgment was applied to identify a reasonable unit price for this project. Where prices were reasonably consistent, the average price was usually applied. However, prices assigned to some work items may still be arguable.

The JOC and MCA Cost Estimating System (MCACES) databases are regionalized to the Fort Chaffee region. Where national average prices were applied, they were adjusted to the Fort Smith location using the R.S. Means City Cost Index. Unit prices effective January 1999 were escalated to represent mid-2000 at an annual rate of 3.0 percent.

For the major cost items, costs were estimated based on both unit prices, as well as labor and equipment requirements. Army, local, and adjusted national average rates were considered.

Hauling debris was estimated assuming use of 22 CY capacity off-road trucks operating at 2 load/haul/dump/return cycles per hour. Use of different equipment or cycle times will result in a different hauling cost estimate.

The incineration estimate includes incinerator equipment, pit construction, gravel apron, 1/2 mile gravel access road, operation (equipment and operators), air monitoring and toxicity testing, and hauling ash. The incinerator price is based on purchase, as this cost is only marginally higher than renting the equipment.

Appendix C provides unit price data used in the demolition estimates.

Environmental Factors

General

Building demolition projects must comply with Arkansas and Federal environmental regulations. Air, stormwater, solid waste, and hazardous waste regulations are the most relevant to the Fort Chaffee demolition project.

Landfill

Under any demolition scenario, large quantities of waste will end up in a landfill. In this case, the Fort Smith landfill is very close. The City official over the landfill operation, Mr. Reikes, indicated that demolition contractors could continue to use the entrance to the landfill from Fort Chaffee. This will eliminate travel on public roads. Of course, contractors can use any permitted landfill they wish.

The Fort Smith landfill is permitted as both a Class 1 (general nonhazardous solid waste) and Class 4 (inert, construction materials) landfill. The Class 4 section of the landfill is currently closed, but the City may reopen it to accept the large amount of debris anticipated from the Fort Chaffee project. They do have the capacity to accept all the debris generated, even though this might amount to nearly a full years worth of waste. The City plans to expand the landfill onto former Federal property. In practice, demolition debris is assumed to be Resource Conservation and Recovery Act (RCRA) nonhazardous. However, samples of debris from Fort Chaffee with heavy LBP applications should be TCLP tested for lead (Pb) prior to landfill disposal.

On 31 July 2000, the EPA issued a policy letter regarding the regulatory status of LBP in demolition debris. In short, the EPA intends to issue a final rule stating that LBP debris from households (defined to include military buildings) is, by definition, not subject to RCRA C hazardous waste regulations. States and local jurisdictions may continue to enforce the more strict requirement for lead testing. Contractors or FCRA will need to contact the state ADEQ and local landfills to learn their interpretation of this memo.

The Fort Smith (Class 1) landfill can accept all ACM generated at Fort Chaffee. The ACM must be properly packaged and manifested.

FCRA and the City entered into an agreement on 16 November 1999 (Resolution R-280-99), which would allow FCRA (or their contractor) to dispose of 80,000 CY of debris at no charge. However, the debris must be chipped, and “clean” as de-

fined as suitable for a Type Y compost facility in ADEQ Regulation 22, Chapter 8. This classification is intended for municipal yard waste (e.g., grass, branches). It is not intended for industrial or construction materials. Any wood accepted under this agreement would have to be free of LBP (or any paint), ACM, nails, roofing, etc. Therefore, this agreement, as written, will have no practical application to building removal at Fort Chaffee.

Incineration

During the summer of 1999, CERL attended a meeting among representatives from FCRA, Fort Chaffee, ADEQ, and Army Corps Little Rock District to discuss environmental issues associated with the transfer and redevelopment of Fort Chaffee. At that meeting, ADEQ indicated they likely could permit burning of demolition debris at Fort Chaffee as a cost saving measure over landfilling. Subsequently, it was decided incineration was one of the options that should be included in CERL's analysis.

In December 1999, CERL met with several ADEQ staff members at their offices in Little Rock. At those meetings, ADEQ was very negative about the possibility of burning debris. Granting a permit would be very unlikely. Monitoring requirements were unclear. If burning would be allowed, all ACM must be removed beforehand (in contrast, under mechanical demolition, some ACM can remain).

In March 2000, CERL sought clarification from ADEQ personnel. They reacted most negatively to the suggestion of burning demolition debris. Open burning is controlled by Regulation 18, Arkansas Air Pollution Control Code, ADEQ Chapter 6. Per advice of ADEQ legal staff, trench burning (as proposed) falls under the definition of open burning and therefore, is generally prohibited in Arkansas. Even if the agency would make a special exception for the Fort Chaffee project, the restrictions imposed may effectively eliminate the burning option.

Subsequent inquiries to ADEQ over the summer of 2000 indicate that they have not made a definitive policy decision on this question.

If trench burning were allowed, it could only be done if:

- FCRA can make argument that there is no other viable option
- FCRA obtains special permission from ADEQ director, not "permit" per se
- no LBP-contaminated material was burned
- no ambient air monitoring was required

- the resultant ash passed testing for RCRA C hazardous waste characteristics (e.g., heavy metals) before landfill disposal.

Asbestos Containing Materials (ACM)

ACM are classified in different ways. All ACM information here is based on the EPA National Emission Standard for Hazardous Air Pollutants (NESHAP) for asbestos, as provided to CERL by ADEQ. Here are some commonly used definitions per EPA:

- "Friable" asbestos material means any material containing more than 1 percent asbestos and can be crushed by hand when dry.
- "Nonfriable" asbestos material means any material containing more than 1 percent asbestos and cannot be crushed by hand when dry.
- "Category I" nonfriable ACM means gaskets, resilient floor covering, and asphalt roofing.
- "Category II" nonfriable ACM means any ACM (other than Category I) that cannot be crushed by hand when dry.
- "Regulated" ACM (RACM) means:
  - friable ACM
  - Category I nonfriable ACM that has become friable
  - Category I nonfriable ACM that has been or will be subjected to sanding, grinding, cutting, abrading, or burning

or

  - Category II nonfriable ACM that has a high probability of becoming crushed in the demolition process.

RACM is the material of concern in any demolition or renovation project.

The asbestos NESHAP regulation describes what ACM must be removed under different types of demolition practices.

- Mechanical demolition: Under demolition with heavy machinery (e.g., trackhoe, bulldozer), Category I nonfriable ACM does not have to be removed from the building. All of the rest must be removed by an ADEQ certified contractor.
- Manual deconstruction: The rules for ACM removal under a deconstruction scenario do not seem to be as clear cut, probably because this type of operation is relatively rare, at least on a commercial basis. In all cases, friable ACM must be removed by a certified contractor. Technically, all nonfriable ACM can stay, as long it is not crushed, cut, or otherwise made friable. For

example, deconstruction crews (not asbestos contractors) could carefully remove transite siding by hand before removing exterior sheathing. This was done at Fort McCoy, WI. Practically speaking, most nonfriable ACM would have to be removed by qualified crews. For example, oxychloride flooring cannot be removed without crushing. It has to be removed before deconstruction crews can salvage the floor structure. Certainly, the prior removal of all ACM will increase the productivity of deconstruction crews.

- Burning: To keep asbestos fibers from becoming airborne, no ACM may be burned along with demolition debris.

The following ACM contractors provided CERL with cost estimates and other related information.

- Ecologic, Inc., Little Rock, AR
- EnviroRem, Inc., Memphis, TN
- American Asbestos, Inc., Oklahoma City, OK
- HEC Environmental Group, Inc., Texarkana, AR
- Mid-South Environmental, Little Rock, AR.

Other Hazardous Materials

There are only a few other materials in Fort Chaffee buildings that cannot be landfilled.

- PCB-containing ballasts: Most, if not all, ballasts in fluorescent light fixtures manufactured before 1979 contain polychlorinated biphenyls or PCBs. PCBs were banned by the Toxic Substances Control Act (TSCA) of 1976. PCBs have a host of adverse health effects, bioaccumulate up the food chain, and have a very long half-life in the environment and the human body. The fluorescent fixtures at Fort Chaffee vary in age considerably, so it is difficult to predict PCB presence. CERL recommends that the FCRA assume that all ballasts contain PCBs unless they are clearly marked “No PCBs.” PCB-containing ballasts must be disposed of in a licensed hazardous waste landfill or incinerator. The ballasts must be manifested and transported as a hazardous waste. CERL recommends that the FCRA contract with a respected, licensed hazardous waste company to handle all the disposal arrangements. The physical removal of ballasts from the buildings is straightforward and could be performed by general labor, unless the ballasts are leaking. If leaking, a qualified contractor should do the removal. Anything the leaking fluid touches becomes “PCB waste” for regulatory purposes.

- Universal Waste: "Universal Waste" is a subset of RCRA hazardous waste. The EPA realized that some materials, while technically RCRA hazardous, are so wide spread in businesses, homes, etc., that strict hazardous regulation is not practical. There are lesser restrictions on universal waste in the hope that these materials will be safely disposed of or recycled. Universal waste items at Fort Chaffee are mercury switches in thermostats, and fluorescent light tubes (mercury). Arkansas has not yet adopted the universal waste rule (as of January 2000). However, ADEQ and environmental contractors expect the state to adopt this rule sometime in 2000. Universal waste materials should be shipped and disposed by a licensed contractor.
- Mercury switches in thermostats: The mercury ampoules can be carefully removed from the thermostat housing to reduce waste volume (i.e., disposed of separately from the thermostat housing). This might not be worth the effort and risk. The thermostats should be stored in a sturdy, impervious, labeled container before shipping to a licensed disposal site or recycler.
- Fluorescent tubes: Fluorescent tubes should be removed from fixtures and packed into original clearly labeled, corrugated containers, or similar, for shipping to a recycler.

Several local hazardous waste contractors were contacted as part of this study. SafetyKleen of Fort Smith was the only one who responded.

Demolition Cost Summaries

Estimates for each disposal option are summarized in Tables 1 and 2. Appendix D provides further detail.

Table 1. Demolish and landfill alternative (rounded).

Division 01, General Requirements	$31,000
Division 02, Sitework	
020 550 Site Demolition	224,200
020 060 Building Demolition	8,025,000
020 700 Selective Demolition	225,400
020 750 Concrete Removal	1,132,000
020 800 Hazardous Material Abatement	4,334,000
022 200 Excavation and Backfill	776,400
029 300 Lawns and Grasses	41,100
Total, including project contingency, GC O&P	$18,633,000

Table 2. Demolish and incinerate alternative (rounded).

Division 01, General Requirements	$31,000
Division 02, Sitework	
020 550 Site Demolition	224,200
020 060 Building Demolition	6,068,000
020 700 Selective Demolition	225,400
020 750 Concrete Removal	1,132,000
020 800 Hazardous Material Abatement	5,053,400
022 200 Excavation and Backfill	776,400
029 300 Lawns and Grasses	41,100
Total, including project contingency, GC O&P	$17,075,000

The major cost components for each alternative are the building demolition and hazardous materials abatement. Landfilling all building debris will cost roughly $2.5 million. Incineration will reduce hauling and landfilling costs by roughly $2 million. However, all ACM must be removed from the buildings if the debris will be incinerated, therefore ACM abatement costs are roughly $.5 million higher. The total cost difference is roughly $1.5 million.

Appendices D and E provide further detail.

4 Cost-Reduction Potential

Cost-Reduction Methods

Alternatives to total demolition and landfilling exist which can reduce the overall cost of removing the buildings at Fort Chaffee. These involve two basic elements: (1) waste diversion and (2) capitalizing on the value of the buildings' materials and components.

The following are addressed in the cost analysis:

- reducing the number of buildings to be removed
- removing items for resale (i.e., "cherry-picking")
- salvaging items for recycling and resale
- "deconstructing" buildings for salvageable materials
- soliciting "best terms" from the construction industry or community.

It is important to note that each of these methods may be employed to varying degrees. They are also not mutually exclusive. In practice, removing the buildings will most likely involve combinations of methods. This cost analysis will assume several scenarios, although other variations may also be feasible.

Scope

This analysis describes the potential to offset costs for removing the Fort Chaffee buildings through alternatives to simple disposal and, therefore, reduces the overall cost to the owner (the FCRA). Complete cost estimates were not developed. Costs for site demolition, ACM and hazardous materials' disposal, and site restoration will be similar regardless of removal methods. Due to the nature of the available deconstruction and salvage cost data, there is also a much greater level of uncertainty associated with them.

The strategies applied to removing the buildings will also have a significant effect on costs. How the FCRA solicits services, which services are retained, con-

tractual arrangements, ownership of materials, and other factors will affect the actual costs or income potential.

The cost analyses for the alternatives to simple disposal described below, therefore, indicate potential cost impact and feasibility, as opposed to a cost estimate per se.

Significant Elements of the Analyses

The significant elements of this part of the cost analysis are:

- cost impact of removing reusable building materials and components
- cost impact salvaging building materials by:
  - removing / stripping from the buildings
  - deconstructing the buildings
- cost impact of reducing the numbers of buildings to be demolished.

This cost analysis describes each method individually. The budget level cost estimate for demolition is used as a basis of comparison.

Assumptions

The following assumptions were made in order to compile costs and make comparisons among alternatives.

- While a rapid removal of the buildings is desirable, there is no specific deadline or time constraint for removing the majority of the buildings. There is a great deal of flexibility to a removal schedule. The additional time required for deconstruction or salvaging will be available.
- Components from only the recently upgraded buildings are considered reusable. Items considered for salvage include doors and windows, hardware, electrical load centers or circuit breaker boxes, light fixtures, new plumbing fixtures, etc.
- Some mechanical equipment from the recently upgraded buildings (i.e., furnaces, heat pumps, and water heaters) may possibly be reused. However, a lower salvage rate is assigned to these items because their condition is unknown.
- Steel siding may possibly be removed for reuse, but a more realistic assumption is to recycle this material.

- All steel and ferrous metals are included in recyclable materials.
- Only unpainted lumber is considered to be salvageable. It is assumed that 50 percent of the buildings are painted on the interiors, thus contaminating exterior wall framing and sheathing with LBP.
- A loss factor is included with salvageable lumber, and is described in the cost analyses. Because of contamination from pigeon droppings, lumber from the motor pool buildings is not included in the salvage value.
- The demolition cost estimates assumed concrete rubble would not be landfilled. Rather, it can remain stockpiled until uses are found and the stockpile is depleted. For this cost analysis, however, it is also assumed that concrete rubble cannot remain stockpiled indefinitely, and if not used, must be disposed of in the appropriate fashion (in which case the cost must be added to the demolition estimates). Therefore, landfill cost for concrete rubble is included as an avoided cost if concrete materials are recycled.
- The FCRA is receptive to donating buildings to charitable organizations, given the organization assumes all cost of removal and removes the building in its entirety, or at least to the foundation.

Price Data

Unlike conventional construction cost data, there is no widely published data source for "deconstruction" or "used building materials." The following sources were used in compiling salvage costs and material values:

- case study data on "deconstructing" buildings (mostly wood frame), including: BRAC installations at Fort Ord, CA, and the Alameda Naval Air Station, CA; pilot projects conducted by the U.S. Department of Housing and Urban Development; and research conducted by the National Association of Home Builders
- cost data for selective demolition and removal of building components from R.S. Means' *Building Construction Cost Data* and *Facilities Maintenance and Repair Data*
- demolition costs for removing mechanical and electrical equipment, framing members, finishes, and other building materials and components from The U.S. Army Job Order Contract (PDS99) Unit Price Book
- information from local salvage businesses, mostly trading in metal scrap (some local outlets were found for other building materials [lumber, brick], although the information offered was more anecdotal than price quotes)
- local building movers
- HfH Re-Stores

- commercial, academic, and state recycled materials exchanges
- U.S. Department of Agriculture Forest Products Laboratory
- additional outlets for wood materials identified by the Arkansas Department of Economic Development.

The University of Florida Center for Construction and Environment provided data on labor efforts and salvage values based on their deconstruction case study data and model development.

Simple models were developed to calculate a "deconstruction" cost for wood frame buildings. Deconstruction tasks were identified and applied to each of the major building types. Both R.S. Means and the JOC unit price data were applied. The modeled costs and historic cost data were reasonably consistent, although costs based on the JOC unit price data were somewhat higher than case study data.

Some adjustments were made to the JOC unit price data to be more consistent with the deconstruction nature of the work. It is typical for deconstruction projects to utilize unskilled labor. Therefore, the common laborer rate was substituted for skilled trades' rates. For example, disassembling and replacing a circuit breaker panel in an occupied building will require an electrician, and would be far more labor intensive than simply removing the panel to dispose of it. Carpenters, likewise, would likely not be used for disassembling wood structural components. Some other specific tasks were adjusted according to what was determined to be a more reasonable labor effort for the task.

A dollars-per-SF ($/SF) cost was applied to the total building inventory to approximate deconstruction costs. The $/SF value used, while still somewhat arguable, is consistent with case study data.

Salvage and resale values are the most variable component of this analysis. Values were obtained for the various materials and components, and were applied to the building materials' quantities. Where prices were not available through published sources, resale value of used components is assumed to be 50 percent of their retail price. This is an accepted rule of thumb among used material sources.

A conservative approach was taken to represent the labor effort required to remove building components and materials so not to underestimate costs. Likewise, a conservative approach was taken to utilize reasonable values, but not artificially inflate the value of extracted materials. On a $/SF basis, the salvage

values used in this analysis are low compared to case study data. Salvage value may actually be somewhat higher than shown in this report.

Unit costs and salvage values used for these estimates are provided in Appendix F.

Environmental Factors

There are two environmental concerns associated with proposed demolition alternatives.

Lead-Based Paint (LBP)

LBP will cover much (not most) of the salvageable building components. If the building materials are salvaged, reused, and/or sold, they are technically not a "waste" and, therefore, cannot be a RCRA hazardous waste. Certainly, one should exercise prudence in the handling of LBP items. Low value items with many coats of LBP (or LBP in poor condition) should probably be landfilled directly. Any seller, buyer, or other user of LBP covered items should be notified in writing of the presence of LBP.

Current guidance on the disposal of LBP-contaminated materials is discussed in Chapter 3, "Landfill."

Concrete Stockpile

CERL assumed that none of the concrete debris (e.g., foundations) would be landfilled. It could be crushed, sold, and reused off-site as the demolition progresses. Or, it could be stockpiled somewhere on Fort Chaffee property for future crushing and use by any public or private entity. Piles of "waste" fall under solid waste regulations. CERL spoke with ADEQ solid waste staff, who indicated that such a stockpile is permissible if there is a specific plan for reuse, and a finite, reasonable time schedule for removal. FCRA would certainly want to make ADEQ aware of their intentions well in advance.

Removing Reusable Items

High-Value Items for Resale

It is common for demolition contractors to salvage the easily removable items from a building prior to demolition. This practice is commonly referred to as "cherry picking" when the salvage effort concentrates on the highest-value items that can be removed with minimal effort. It is assumed that only recently renovated buildings contain items that would have resale value. The following items are included in this analysis.

- plumbing fixtures and equipment
- selected mechanical equipment
- electrical switch and circuit breaker boxes
- fire detection and alarm panels
- interior doors and hardware
- miscellaneous interior fixtures
- exterior doors and hardware
- fire escape ladders and stairs.

A detailed survey of all upgraded buildings was not conducted for this study. Therefore, a conservative approach was taken to taking-off quantities. They are in all likelihood undercounted, and actual quantities will be somewhat higher.

There are other items that may also be marketable, such as heaters, fan units, select interior cabinetry and specialties, and others. However, to be conservative, only the major items listed above were included in this analysis.

If these items were removed prior to demolition, the impact on the overall demolition cost is summarized as follows (dollar values are rounded):

Approximate salvage value	$ 498,000
Approximate removal cost	$ 27,000
Net value	$ 471,000

Therefore, the net value of building components and materials that can be easily salvaged from the recently upgraded buildings prior to demolition is estimated to be roughly $471,000. This figure also includes overhead and profit, assuming a commercial contractor would perform demolition services. Reduction of hauling and landfilling debris volume resulting from "cherry picking" would be relatively insignificant, so it was not included in this analysis.

In a demolition contract, "cherry picking" would be a feasible alternative to outright demolition and landfilling of all building components. Salvage value would exceed removal cost by almost $500,000, and these funds could offset some of the building removal costs. While the impact on the overall cost is not enormous, it is significant. Actual savings to the owner will vary, depending on the contract provisions and responsibility for removing the items, ownership, and resale income. Appendix G provides removal costs and salvage value for items.

Salvage for Reuse or Recycling

Salvage efforts focusing on less-valuable materials and fixtures can also be worthwhile. Many such items can be reused while others have economic value as recyclables. If, however, the construction schedule limits the time available for removing items, the potential for salvaging lower-value materials is often overlooked. It is assumed that the building removal schedule at Fort Chaffee will permit the removal of everything of value. Items in the Fort Chaffee buildings that were found to have salvage value are:

- plumbing fixtures and equipment
- selected mechanical equipment
- copper pipe
- electrical switch and circuit breaker boxes
- fire detection and alarm panels
- light fixtures
- interior doors and hardware
- miscellaneous interior fixtures
- exterior doors and hardware
- windows (from upgraded buildings)
- structural steel items
- bricks.

Cast iron radiators, sheet metal ducts, steel and cast iron pipe, boilers and hot water storage tanks, cast iron plumbing fixtures, and sheet metal vents and flashing are salvageable, and all have value. However, the prices quoted by local salvage vendors at the time of this study would be very close to the cost of removing these items. Therefore, there would be no cost offset for salvaging these items, and neither their removal cost nor their salvage value are included in the cost analysis. If more efficient methods of removing these materials can be developed (large-scale removal of metal siding, for example), it is likely that salvaging scrap metal items can achieve a positive cost impact.

It is interesting to note that, despite low quotes, salvage vendors have purchased boilers and other scrap ferrous materials from contractors that have recently demolished buildings at Fort Chaffee. This suggests that, in an actual job situation, the market does support removing and selling these items for scrap.

If these items were removed prior to demolition, the impact on the overall demolition cost is summarized as follows (dollar values are rounded):

Approximate salvage value	$ 854,400
Cost avoidance*	$ 237,000
Approximate removal cost	$ 183,000
Net value	$ 908,000

*Removal costs would exceed the salvage value.

In a demolition contract scenario, extensive salvaging materials for reuse or recycling would be a feasible alternative to demolishing and landfilling all building contents. For most salvageable items the salvage value and disposal cost avoidance should exceed removal cost by over $900,000, which can then offset some of the building removal cost. This figure also includes overhead and profit, assuming a commercial contractor would perform demolition services. This scenario assumes some items with salvage value would be abandoned and landfilled, as their removal cost would exceed their salvage value. Other scenarios with reduced labor costs may render more items economical to salvage. Actual savings to the owner will vary, depending on the contract provisions and responsibility for removing the items, ownership, and resale income.

Appendix H provides quantities and value for salvaged items.

Concrete rubble is also recyclable, but is discussed below under “Volume Reduction.”

Volume Reduction

Concrete Debris

Concrete debris can be ground to reduce volume and the expenses associated therein. It is also possible that the ground materials may have some other use or may substitute for some material that may otherwise have to be purchased.

Prices given for concrete grinding were $6 – $7/CY. In terms of economics only, this is roughly equivalent to the hauling and landfilling cost of $6.75/CY. The

salvage value of steel reinforcing is not significant; roughly $30,000 for 500 tons or rebar.

Recent Army and CERL experience shows significant savings potential by using ground concrete rubble in lieu of purchasing quarried gravel or fill materials. There are roughly 193,000 tons of concrete in the buildings' foundations and site structures (such as wash racks). A reasonable value of cost avoidance would be $10/ton, or roughly $1.93 million if all rubble was reused.

FCRA is not a consumer of aggregate materials, and would not be purchasing them for other purposes. The Arkansas Department of Transportation, Sebastian County, and the City of Fort Smith expressed a passing interest in ground concrete rubble for their road construction projects. Landfill capacity is not a concern at this time.

As only an alternative to landfilling concrete debris, grinding is not likely to reduce cost. Any additional cost, however, would not be significant either. If the FCRA can identify a market for concrete rubble, there could be well over a million dollars resale income potential.

Wood Debris

Markets exist for clean ground wood debris as a fuel source. However, building rubble would not be acceptable for this purpose. Cost reduction by reducing the volume of debris to be landfilled would be the only motivation for grinding.

The cost for grinding wood debris is estimated to be $6.25/CY. Again, this is roughly equivalent to the hauling and landfilling cost. As there is no other reuse potential for ground wood debris, and as there is no concern about landfill capacity, there would be no economic advantage to grinding.

New Landfill Construction

An alternative to paying tipping fees at a municipal landfill would be to construct a new landfill on the Fort Chaffee property for disposal of the demolition debris. The costs involved with this would be roughly as follows:

Design and permitting	$ 120,000*
Construction	1,500,000
Operation	200,000/yr
Closing and monitoring	1,000,000
*Minimum one year lead time	

Assuming this landfill were to operate for five years, total expenses would be over $4.5 million. As tipping fees at the Fort Smith landfill would be roughly $2 million, construction of a new landfill does not appear to be a feasible alternative.

Deconstruction

Deconstruction is the term for disassembly of a building to salvage materials and components that have traditionally been perceived as inaccessible or of little value. While the cost of deconstruction is higher than simple demolition, salvage value and cost avoidance make this option viable in many cases.

The following items would be removed and/or disassembled for resale and salvage:

- plumbing fixtures (upgraded buildings only)
- electrical switch and circuit breaker boxes (upgraded buildings only)
- fire detection and alarm panels (upgraded buildings only)
- light fixtures (upgraded buildings only)
- interior doors and hardware (upgraded buildings only)
- steel toilet partitions (upgraded buildings only)
- acoustic ceiling tile (upgraded buildings only)
- exterior doors and hardware (upgraded buildings only)
- steel siding
- cast iron radiators
- steel, cast iron, and copper pipe
- boilers and hot water storage tanks
- cast iron plumbing fixtures
- sheet metal vents, flashing
- windows
- sheet metal ducts
- structural steel items
- lumber
- bricks.

Figures 12 – 18 provide examples of these items.

It is assumed that the motor pool buildings will be demolished in total, and no salvage value is attributed to them, with the exception of the boiler and chimneys. All exterior wood siding and interior construction are excluded from salvage value because of LBP-contamination. While transfer (i.e., resale) of LBP-contaminated materials is not prohibited by regulation, prevailing opinion (at least within the Army) is to landfill these materials.

The costs and values in deconstructing buildings are estimated to be as follows:

Approximate salvage value	$ 4,500,000
Cost avoidance*	$ 6,800,000
Approximate deconstruction cost	$ 9,200,000
Potential net value	$ 2,100,000

*Reduction in demolition, hauling, and landfilling expenses.

A major contributor to deconstruction value is roughly $2 million in lumber salvage. Demolition cost of $5.2 million would be avoided, and hauling and landfilling costs would be reduced by roughly $1 million.

The value of salvaged materials and avoidance of disposal costs exceeds the cost to disassemble the buildings by roughly $2 million. This figure also includes overhead and profit, as if a commercial contractor would perform these services. Therefore, deconstructing the buildings would be a feasible alternative to demolishing them and landfilling the debris.

Removing buildings for deconstruction may be accomplished under a number of arrangements between the owner and party performing the deconstruction. These may include contracting for demolition services (presumably at a greatly reduced price), selling buildings, or transferring the buildings at no cost. Actual cost reduction, or income, to the owner will vary depending on the provisions of the agreement and responsibility for removing the items, ownership, and resale income.

It must be emphasized that there is still a degree of uncertainty in estimating deconstruction costs and values. Different assumptions and different values can alter these estimates considerably. The University of Florida Center for Construction and Environment has estimated total net deconstruction cost of the Fort Chaffee buildings to be considerably less than this analysis.

Appendix I provides approximate deconstruction costs and salvage values.

During the development of the deconstruction analyses, Forest Products Laboratory and HfH personnel had not seen the buildings first-hand. Subsequent to presenting these analyses to the Fort Chaffee Base Transition Coordinator (BTC) and the FCRA, they were able to examine the buildings closely. It was determined that the siding material did, in fact, have a considerable resale potential, and that there was a considerable amount of salvageable lumber in the motor pool buildings. Even with a conservative recovery rate for these items, the salvage value for the deconstruction scenario is up to $900,000 greater than shown in the analysis. If the paint can be economically removed from the siding, its resale value should be even greater.

Reducing the Number of Buildings to be Removed

General Public Interest

The FCRA's cost of demolition will be reduced if others were to remove some number of buildings from the Fort Chaffee property. Anecdotal evidence strongly suggests that, given the opportunity, individuals or groups would remove some buildings whole, or possibly deconstruct them for salvage value. It is assumed such a transaction would be of no cost to the individual (if the FCRA donates the building), but the individual would be responsible for all removal or relocation costs.

The Arkansas Valley HfH expressed interest in possibly obtaining "a couple" of the upgraded bachelor officers' quarters (BOQ) buildings. These buildings would used to house several families or for families "in transition" awaiting construction of new housing. These buildings would cost roughly $45,000 each to move.

One contractor expressed interest in the small, one-story administrative buildings similar to those in the 800-area. He even offered to pay a nominal price. These buildings could be moved for roughly $15,000 each.

However, without a widespread solicitation of interest, the likelihood of someone assuming ownership of buildings, or the number of buildings that may be removed in this manner is highly speculative. Once Fort Chaffee development and building removal plans become more publicized within the region, greater interest may be stimulated.

For the purposes of this analysis, an assumption will be made that roughly 30 buildings (approximately 100,000 SF) can be transferred to others and removed

from the FCRA's demolition requirement. While speculative, this is consistent with the interest found during this study.

The cost avoidance in transferring 30 buildings to others would be as follows:

Demolition (buildings only)	$200,000
Hauling and landfilling	$ 84,000
Potential savings	$284,000

It is assumed that the ACM and hazardous materials would be removed prior to transfer, and that the building only would be removed, not the foundation.

It is, therefore, feasible and advantageous for the FCRA to divest itself of whatever number of buildings can be transferred to others.

Austin, TX, Habitat for Humanity

The Austin, TX, HfH affiliate is extremely interested in obtaining buildings at Fort Chaffee. The Austin affiliate operates a Re-Store, selling used building products and materials to fund their construction programs. They have been quite successful in marketing used materials and are currently building an expertise in deconstruction. The contact at the Austin Re-Store is:

Mr. Bill Bowman
Habitat for Humanity
Austin Re-Store
310 Comal, Suite 101
Austin, TX 78202
(512) 478-2165, Ext. 112

The Austin HfH has developed an agreement with Fort Hood, TX, to deconstruct a selected building or buildings.

Specific plans for Fort Chaffee buildings have not yet been made. Once the Fort Hood pilot is completed, Austin HfH plans to develop a partnership with the Dallas/Fort Worth, San Antonio, and other affiliates operating Re-Stores to share expenses, as well as returns from the sale of recovered materials. The DA and HfH International are developing a formal partnership statement and will support these efforts. Austin HfH is extremely confident of a positive economic outcome, even considering logistical expenses and the distance from Fort Chaffee to Texas. The proximity of Fort Chaffee to the Fort Smith landfill and ability to

dispose of LBP-contaminated materials increases the viability of this arrangement, in their opinion. Austin HfH will be able to remove several hundred buildings.

The cost avoidance in transferring 300 buildings (roughly 1 million SF) to others (Austin HfH) would be as follows:

Demolition (buildings only)	$2,000,000
Hauling and landfilling	$1,000,000
Potential savings	$3,000,000

It is assumed that the ACM and hazardous materials would be removed prior to transfer, and that only the building would be removed, not the foundation.

Transferring buildings to another entity is feasible to reduce demolition expenses. Interest in buildings from the local community is present, although how many buildings may be requested is uncertain. It may not be a large number. However, as the Austin HfH affiliate is tentatively interested in hundreds of buildings, this alternative does have a significant cost-reduction potential.

Subsequent to presenting the cost analysis to the BTC and FCRA, Austin HfH determined they could assume a general contractor role in coordinating the resources and services required to remove buildings and market the salvaged materials.

Figure 12. Clean roof framing materials.

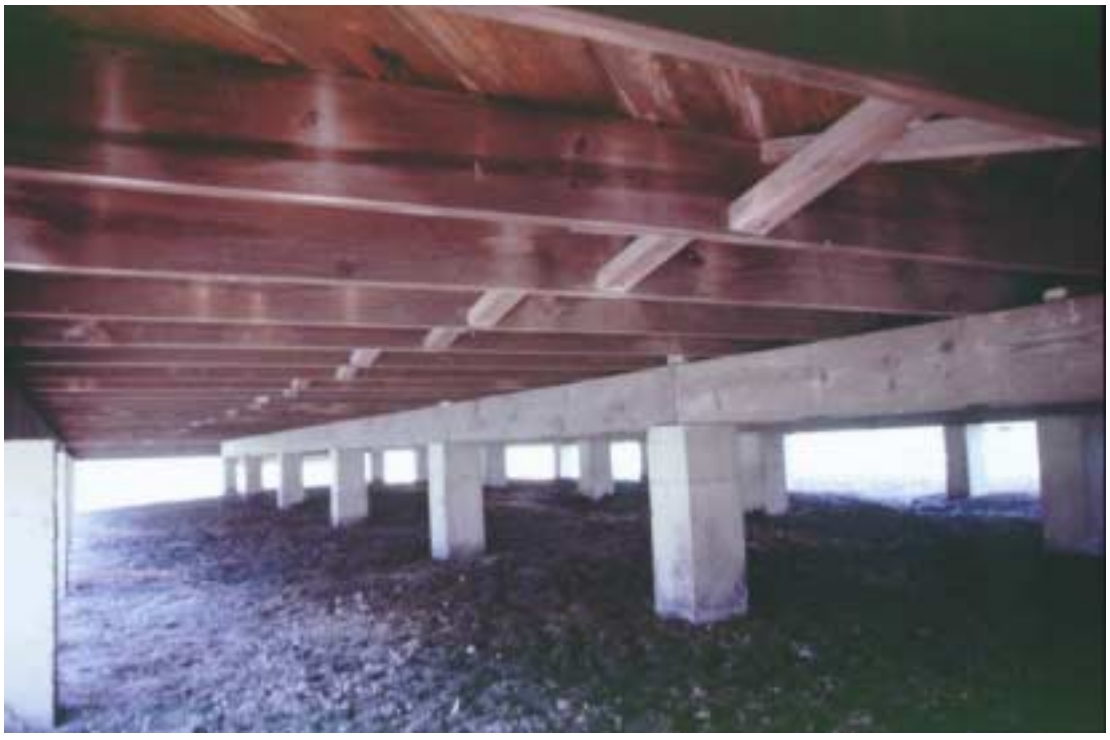

Figure 13. Clean floor framing materials.

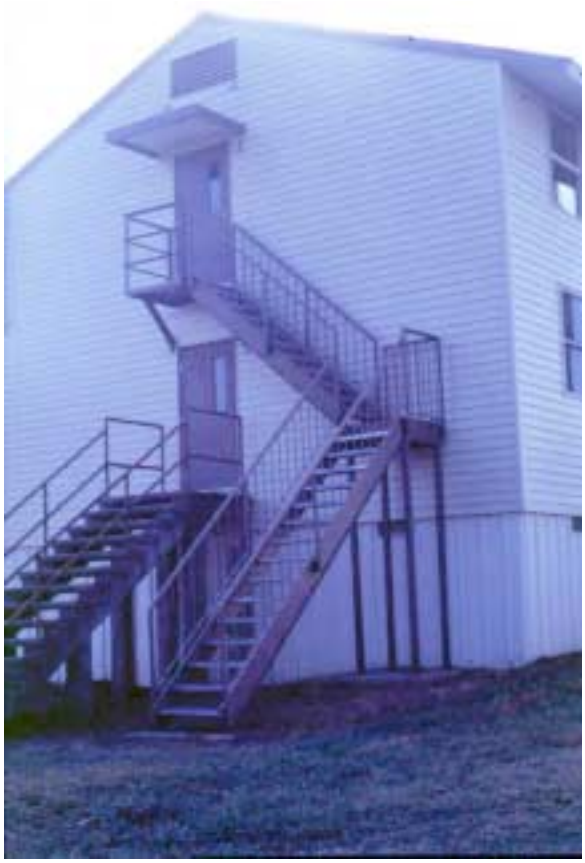

Figure 14. Structural steel fire escape stairs.

Figure 15. New electrical components.

Figure 16. Scrap metals (boiler).

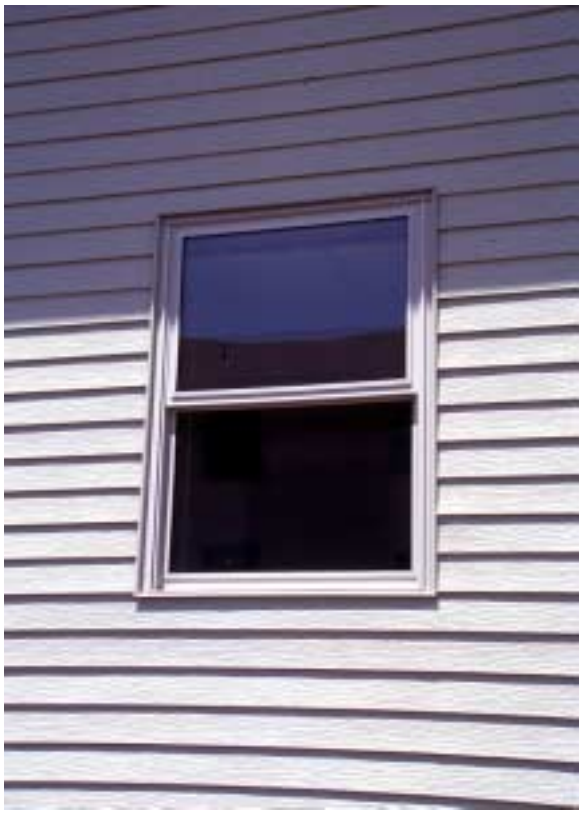

Figure 17. Steel siding, windows.

Figure 18. New plumbing fixtures.

5 Soliciting Best Terms from Prospective Contractors and Project Partners

Project Scoping Issues

Developing contract requirements and soliciting bids for a specific building removal method prevents the use of appropriate options or combinations of demolition methods. Contracting for a single building removal method may not achieve the best economic or environmental results for all stakeholders. For example, a demolition contract may not allow or provide the incentive for significant salvage operations, thereby preventing the owner from recovering a portion of the demolition costs via sale or reuse of salvaged material. Although time constraints frequently discourage salvage operations during a demolition project, this is not actually the case at Fort Chaffee. However, without a meaningful incentive, the path of least resistance in such projects is typically to landfill the debris.

In the past, other LRAs have solicited proposals for deconstructing buildings on BRAC installations. However, without a high degree of certainty that the value of salvaged materials will exceed the cost of their removal, deconstruction can increase the owner's building removal costs.

In the current case, the most economical way to conduct the building removal project while complying with environmental and waste-disposal mandates may be for the FCRA to issue a request for proposals, or RFP, to the construction industry and community at large. The purpose of the RFP would be to solicit proposals for removing the buildings according to certain requirements without specifying any particular strategy or methodology. Any building removal technique would be acceptable as long as it conformed to the specifications and parameters defined in the RFP. The FCRA would evaluate proposals and enter into an agreement or agreements with one or more parties who offered the most favorable terms for performing the work. To accomplish this, the FCRA would have to establish priorities and preferences, and define them in the RFP. In this way, the prevailing economies and resources would lead to the most favorable terms for the owner. Such a strategy for building removal would be analogous to

the design-build project management approach commonly used in the construction industry today.

Considerations for an RFP Soliciting Most Favorable Terms

The concept of best (or most favorable) terms depends both on the goals of the property owner and the specific tasks and/or outcomes that the work is expected to produce.

Considerations for developing the RFP and soliciting terms most favorable to FCRA would include the following:

- economic terms — cost for removal or income potential
- scope of services offered
- schedule for removing buildings
- end results — condition/improvements to the property
- safety, both public and building removal crews
- local economic development and relationship
- environmental compliance
- risk tolerance
- acceptable disposal of ACM
- others.

In addition to specifying its goals and requirements for project outcomes, the FCRA would also have to define tasks and completion criteria, including:

- offeror capabilities and eligibility
- procedures and instructions for participating in the solicitation
- evaluation or selection criteria
- contract or agreement provisions
- safety, environmental, and other regulatory requirements
- description of the project and site conditions
- the engineering requirements for removing the buildings
- acceptance and close-out procedures
- others.

FCRA and its counsel must develop the specific contract requirements, then execute and administer the contract. CERL's role would be to help ensure that the engineering and procedural content is consistent with the contractual content.

Development of the RFP

Following CERL's presentation of the cost analyses for building removal, the Fort Chaffee BTC and FCRA agreed that developing an RFP for most favorable terms would be appropriate. With FRCA input, CERL developed a draft RFP for removing the buildings. The FCRA identified the hospital complex as the first priority for removal, so the RFP was developed around this requirement. The RFP document was also intended to be applicable to other areas of the Fort Chaffee property once any necessary revisions were made to the project description, scope, or site data included in the draft RFP.

The draft RFP was presented to the FCRA and its engineering consultant, Mickle, Wagner, Coleman of Fort Smith. Some revisions were suggested and incorporated into a model RFP for the FCRA's future use. This document is included as Appendix J.

The model RFP includes references to local regulations and includes passages reflecting site-specific conditions and the FCRA's requirements. However, the RFP document could readily be used as the basis for a similar RFP by any installation facing similar building-removal requirements. Therefore, the document is offered as an Army resource that is not necessarily confined to a Fort Chaffee application.

6 Conclusions

Demolition

The conventional method for removing the WWII-era wooden buildings from the Fort Chaffee property would be to demolish them and landfill the debris. This approach is well understood by the local contractor community, and the City of Fort Smith has no concerns about the capacity of the municipal landfill to handle the expected 380,000 CY of debris.

The costs for site demolition, removal of ACM and hazardous materials, removal of foundations, and restoration of the site after demolition will be equivalent regardless of which method is used to dispose of the debris.

Demolishing the buildings and landfilling the debris would cost approximately $18.6 million. Incinerating the demolition debris onsite would be one way to reduce disposal costs. Demolition and incineration would cost approximately $17.1 million, or approximately $1.5 million less than landfilling the debris. However, it appears doubtful that the Arkansas Department of Environmental Quality would allow incineration.

Cost-Reduction Potential

There is estimated to be approximately $4.5 million worth of materials that could be removed from the buildings and reused or recycled. Major items include windows and doors, plumbing fixtures, mechanical and electrical components, scrap metals, lumber, and timber. Reuse and recycling of such materials could reduce project costs in two ways:

- through recovery of the salvage value of various building materials and components
- through cost avoidance resulting from diversion of solid waste from the municipal landfill.

It is feasible to "cherry pick" high-value reusable items from the upgraded buildings prior to demolition. The net value to these items is roughly $471,000.

It is also feasible to perform more extensive salvage on the buildings prior to demolition. The net value of the recovered materials, as well as the avoidance of hauling and landfilling costs, would be roughly $900,000.

Deconstruction of the buildings is also a feasible alternative. As there are relatively little historical cost data on which to base an estimate, there is still some uncertainty in the costs involved and the values of salvaged materials. However, a reasonable estimate for the net value of deconstruction is roughly $2 million.

After the initial cost analysis it was determined that additional lumber materials could be salvaged, and at a high value. Therefore, a realistic salvage figure could be as much as $900,000 higher than the original analysis indicated.

Another feasible alternative would be to transfer ownership of some buildings to others, thereby reducing the number of buildings to be demolished (with resulting cost savings to the FCRA). The Austin, TX, HfH affiliate is one party interested in obtaining a significant number of buildings for deconstruction. Transfer of 300 buildings can reduce demolition, hauling, and landfilling costs by $3 million.

Reducing debris volume through grinding would be roughly equivalent in cost to landfilling the debris. Based only on an economic comparison, grinding of the debris would not be feasible.

Constructing a new landfill on the Fort Chaffee property would be no less costly than paying tipping fees at the Fort Smith municipal landfill.

Soliciting Most Favorable Terms from Prospective Contractors

It is evident that there are a number of feasible options for removing the buildings. Soliciting the "most favorable terms" from the construction industry and community can allow the most favorable solution or combinations of solutions to be proposed to the FCRA. Offers may include the most favorable price for removing buildings, offers to transfer buildings (and cost avoidance), and possibly offers to buy buildings for relocation or deconstruction and salvage value. An RFP document has been developed for the FCRA to solicit "most favorable terms."

Acronyms and Abbreviations

ACM	asbestos-containing material
ADEQ	Arkansas Department of Environmental Quality
BOQ	bachelor officers' quarters
BRAC	Base Realignment and Closure
BTC	Base Transition Coordinator
BTT	Base Transition Team
CERL	Construction Engineering Research Laboratory
CY	cubic yard
DA	Department of the Army
EDC	Economic Development Conveyance
EPA	Environmental Protection Agency
ERDC	Engineer Research and Development Center
FCRA	Fort Chaffee Redevelopment Authority
HfH	Habitat for Humanity
HVAC	heating, ventilating, and air-conditioning
JOC	Job Order Contract
LBP	lead-based paint
LRA	Local Redevelopment Authority
MCACES	MCA Cost Estimating System
MIPR	military interdepartmental purchase request
NESHAP	National Emission Standard for Hazardous Air Pollutants
PCB	polychlorinated biphenyl
RACM	regulated asbestos-containing material
RCRA	Resource Conservation and Recovery Act
RFP	request for proposal
SF	square feet
TCLP	Toxicity Characteristic Leaching Procedure
TSCA	Toxic Substances Control Act
UOQ	unaccompanied officers' quarters
USACE	U.S. Army Corps of Engineers
WWII	World War II

Appendix A: Building Inventory

BUILDING TYPE	NUMBER OF BLDGS	TOTAL SF
Barracks	147	769,709
UOQ	20	112,537
Vehicle Maintenance	62	280,878
Warehouse	55	514,165
Mess/Dining	38	147,774
Administration	234	390,741
Medical	82	318,091
TOTAL	**638**	**2,533,895**

Note: 149 buildings are located in the medical complex. However, many are classified as warehouse and administration facilities on real property inventories.

Appendix B: Building Material and Component Quantities

BUILDING CONTENTS	QUANTITY	UNITS
Steel siding, canopies	350	TON
Windows (old)	9,200	EA
Windows (upgraded)	1,900	EA
Exterior doors (old)	1,750	EA
Exterior doors (upgraded)	1,000	EA
Coil overhead doors	85	EA
Sheet metal, flashing, ductwork, finishes, partitions	500	TON
Interior doors (old)	1,400	EA
Interior doors (upgraded)	890	EA
Acoustic ceiling	90,000	SF
Plumbing fixtures (old)	2,000	EA
Plumbing fixtures (upgraded)	1,300	EA
Cast iron, tanks, boilers, pipe, fixtures	600	TON
Furnaces (old)	170	EA
Furnaces (upgraded)	30	EA
Water heaters (old)	270	EA
Water heaters (upgraded)	30	EA
Steel pipe	600	TON
Copper pipe	10	TON
Electrical panels (old)	3,200	EA
Electrical panels (upgraded)	230	EA
Light fixtures (old)	Not counted	EA
Light fixtures (upgraded)	1,300	EA
Structural steel shapes	92	TON
Concrete reinforcing	60	TON
Concrete	58,000	CY
Bricks	2,600	M
Lumber	15,000	MBF

ASBESTOS-CONTAINING MATERIALS (ACM)	QUANTITY*	UNITS
Boiler and Tank Insulation	21,214	SF
Duct Wrap	4,587	SF
Floor Tile	63,092	SF
Heat Shield	15,670	SF
Mud	357	SF
Oxychloride flooring	364,118	SF
Pipe Insulation	76,253	LF
Pipe Joint Insulation	15,253	EA
Shingles	86,415	SF
Transite Board	77,726	SF
Transite Siding	24,450	SF
Concrete stuff	650	SF
Contaminated earth	18,920	SF
Paper	5	SF
Felt	45,200	SF
Floor joint	50	LF
Mastic	23,520	SF
Pipe tape	15	LF
Tarpaper	100	LF
Textured interior finish	10,040	SF
Vent pipe	269	LF
Vibration joint	6	EA
Wall patch	10	SF
Wool insulation	20	SF

*Provided by Fort Chaffee BTT

HAZARDOUS MATERIAL ITEMS		
Fluorescent Tubes (Hg)	1500	EA
Ballasts (PCB)	1000	EA
Thermostats (Hg)	200	EA

Appendix C: Demolition Unit Costs

ITEM	UNIT	COST
Site Demolition 020 550		
Backhoe excavation 24" bucket, medium soil	1.01	CY
Excavate by hand around obstructions	15.73	CY
Backfill, by machine, without compaction	0.69	CY
Remove overhead service cables	0.59	LF
Demolish chain link fence, 6' high,	0.53	LF
Demolish 5 strand barbed wire fence	0.62	LF
Demolish 7"-24" conc pavement, reinforced	44.94	CY
Misc structural steel shapes, angle, demolish	397.10	T
Wood pole, 40', demolish	104.50	EA
Haul to dump 16.5 CY truck, 3 miles	2.35	CY
Same as above, 22-30CY truck	1.60	CY
Building Demolition 020 600		
Building Demolition, Wood Frame	2.00	SF
Pre-engineered metal bldg, 15000 SF, demolish	0.63	SF
Haul to dump 16.5 CY truck, 3 miles	2.35	CY
Same as above, 22-30CY truck	1.60	CY
Incinerate debris	200,000.00	LS
Selective Demolition 020 700		
Sprinkler pump assembly, demolish	148.39	EA
Boilers, gas fired, demolish	418.00	EA
HW storage tanks, demolish	104.50	EA
Furnaces, w/ belt driven blower, demolish	152.57	EA
Fluorescent fixtures, 4 lamp, interior, demolish	13.06	EA
Electric thermostat, 3 wire, demolish	9.41	EA
CMU walls, 8", demolish	0.73	SF
Concrete Removal 020 750		
Demolish reinforced concrete foundation	47.03	CY
Demolish brick/block building foundation	38.67	CY
Hazardous Material Abatement		
Remove ACM from buildings	1.49	SF
Disposal, fluorescent fixtures w/ ballasts & tubes	4.24	EA
Disposal, Hg thermostats & switches	3,024.00	BRL
Excavation / backfill 022 200		
Gravel; excavate & load, medium mat'l	0.73	CY
12 CY wheeled loader		
Furnish & place topsoil, 6" deep	15.68	CY
Rough grade, large area, w/ dozer	2.09	CY
Lawns & grasses 029 300		
Rye, tractor spread	135.85	MSY

Appendix D: Demolition and Landfill Cost Estimate

Ft. Chaffee Building Removal **Cost Analysis** **April 2000**

CSI	ITEM		QUANTITY	UNITS	UNIT PRICE	BARE TOTAL	
DIVISION 01, GENERAL REQUIREMENTS							
	Permits / fees, State of Arkansas, assume single project		1	LS	1,000.00	1,000	
	Mobilization / demobilization, estimated		1	LS	10,000.00	10,000	
	Demolition permit	estimated	1	LS	20,000.00	20,000	
	TOTAL GENERAL REQUIREMENTS						**31,000**
DIVISION 02, SITEWORK							
020 550	**Site Demolition**						
	Disconnect utilities	Excavate, cap, and backfill					
	Gas		200	EA	120.00	24,000	
	Water		588	EA	120.00	70,560	
	Sanitary		570	EA	120.00	68,400	
	Electrical service	Remove overhead drop	588	EA	18.00	10,584	
	Fencing						
	Chain link		28,000	LF	0.53	14,840	
	Barbed wire		7,600	LF	0.62	4,712	
	Miscellaneous site structures						
	Utility poles		30	EA	105.00	3,150	
	Misc steel structures		20	T	380.00	7,600	
	SUBTOTAL SITE DEMOLITION					203,846	
	Add Site Demolition Contingency	10%				20,385	
	TOTAL SITE DEMOLITION						**224,231**

Ft. Chaffee Building Removal **Cost Analysis** **April 2000**

CSI	ITEM	QUANTITY	UNITS	UNIT PRICE	BARE TOTAL	
020 060	**Building Demolition**					
	Wood frame buildings per SF of building	2,534,000	SF	2.00	5,068,000	
	Pre-engineered metal building per SF of building	15,000	SF	0.63	9,450	
	Haul building debris	380,000	CY	1.50	570,000	
	Landfill fee, building debris	380,000	CY	5.25	1,995,000	
	SUBTOTAL BUILDING DEMOLITION				7,642,450	
	Add Building Demolition Contingency 5%				382,123	
	TOTAL BUILDING DEMOLITION					**8,024,573**
020 700	**Selective Demolition**					
	HVAC demolition					
	Sprinkler pump assemblies	29	EA	149.00	4,321	
	Boilers	105	EA	418.00	43,890	
	HW storage tanks	500	EA	60.00	30,000	
	Furnaces	183	EA	153.00	27,999	
	Other mech equipment estimated	1	LS	2,000.00	2,000	
	Haul HVAC debris	2,000	CY	1.50	3,000	
	Landfill fee, HVAC debris	2,000	CY	5.25	10,500	
	CMU demolition					
	Walls, medical complex	43,200	SF	0.73	31,536	
	Building chimneys	230	EA	150.00	34,500	
	Incinerator chimneys estimated	2	EA	5,000.00	10,000	
	Haul CMU debris	2,500	CY	1.50	3,750	
	Landfill fee, CMU debris	2,500	CY	5.25	13,125	
	SUBTOTAL SELECTIVE DEMOLITION				214,621	
	Add Selective Demolition Contingency 5%				10,731	
	TOTAL SELECTIVE DEMOLITION					**225,352**

Ft. Chaffee Building Removal **Cost Analysis** **April 2000**

CSI	ITEM		QUANTITY	UNITS	UNIT PRICE	BARE TOTAL	
020 750	**Concrete removal**						
	Footings and Foundations		27,500	CY	15.00	412,500	
	Slabs on grade		24,300	CY	15.00	364,500	
	Misc. site structures		12,000	CY	15.00	180,000	
	Haul concrete debris	assume stockpiled	95,700	CY	0.75	71,775	
	Landfill fee, concrete debris	on-site and will not be landfilled	95,700	CY		0	
	SUBTOTAL CONCRETE REMOVAL					1,028,775	
	Add Concrete Removal Contingency	10%				102,878	
	TOTAL CONCRETE REMOVAL						**1,131,653**
020 800	**Hazardous Mat'l Abatement**						
	Remove ACBM	per SF of building	2,590,000	SF	1.49	3,859,100	
	Air monitoring / testing	all tests	300	DAY	426.00	127,800	
	Remove fluorescent fixtures		1,000	EA	13.00	13,000	
	Remove Hg thermostats, switches		200	EA	9.40	1,880	
	Haul ACBM		2,064	CY	2.35	4,850	
	Landfill fee, ACBM		2,064	CY	55.00	113,520	
	Dispose fluorescent fixtures incl ballasts and tubes		1,000	EA	4.24	4,240	
	Dispose Hg thermostats, switches		1	BRL	3,024.00	3,024	
	SUBTOTAL HAZARDOUS MATERIAL ABATEMENT					4,127,414	
	Add Haz Mat'l Abatement Contingency	5%				206,371	
	TOTAL HAZARDOUS MAT'L ABATEMENT						**4,333,785**
022 200	**Excavation / backfill**						
	Furnish and place topsoil		50,000	CY	14.00	700,000	
	Rough grade to drain		2,900	CSY	2.00	5,800	
	SUBTOTAL EXCAVATION / BACKFILL					705,800	
	Add Excavation Contingency	10%				70,580	
	TOTAL EXCAVATION / BACKFILL						**776,380**

Ft. Chaffee Building Removal **Cost Analysis** **April 2000**

CSI	ITEM		QUANTITY	UNITS	UNIT PRICE	BARE TOTAL	
029 300	**Lawns and grasses**						
	Seed, machine spread		290	MSY	135.00	39,150	
	Add Lawns and Grasses Contingency	5%				1,958	
	TOTAL LAWNS AND GRASSES						**41,108**
TOTAL PROJECT DIRECT COST							**14,788,080**
	PROJECT CONTINGENCY	5% of Total Project Direct Cost					739,404
	SUBTOTAL						15,527,484
	GC OVERHEAD AND PROFIT	20% of Total Project Direct Cost incl Contingency					3,105,497
TOTAL PROJECT ESTIMATE							**18,632,981**

Appendix E: Demolition and Incineration Cost Estimate

Ft. Chaffee Building Removal **Cost Analysis** **April 2000**

CSI	ITEM		QUANTITY	UNITS	UNIT PRICE	BARE TOTAL	
DIVISION 01, GENERAL REQUIREMENTS							
	Permits/fees, State of Arkansas; assume single project		1.00	LS	1,000.00	1,000	
	Mobilization / demobilization,	estimated	1.00	LS	10,000.00	10,000	
	Demolition permit	estimated	1.00	LS	20,000.00	20,000	
	TOTAL GENERAL REQUIREMENTS						**31,000**
DIVISION 02, SITEWORK							
020 550	**Site Demolition**						
	Disconnect utilities	excavate, cap, and backfill					
	Gas		200.00	EA	120.00	24,000	
	Water		588.00	EA	120.00	70,560	
	Sanitary		570.00	EA	120.00	68,400	
	Electrical service	remove overhead drop	588.00	EA	18.00	10,584	
	Fencing						
	Chain link		28,000.00	LF	0.53	14,840	
	Barbed wire		7,600.00	LF	0.62	4,712	
	Miscellaneous site structures						
	Utility poles		30.00	EA	105.00	3,150	
	Misc steel structures		20.00	T	380.00	7,600	
	SUBTOTAL SITE DEMOLITION					203,846	
	Add Site Demolition Contingency	10%				20,385	
	TOTAL SITE DEMOLITION						**224,231**

Ft. Chaffee Building Removal **Cost Analysis** **April 2000**

CSI	ITEM		QUANTITY	UNITS	UNIT PRICE	BARE TOTAL	
020 060	**Building Demolition**						
	Wood frame buildings	per SF of building	2,534,000.00	SF	2.00	5,068,000	
	Pre-engineered metal building	per SF of building	15,000.00	SF	0.63	9,450	
	Incinerate debris						
	Construction, incl equipment, gravel apron, and 1/2 mile access		1.00	LS	200,000.00	200,000	
	Operation, incl handling and air monitoring		10.00	MO	35,600.00	356,000	
	Excavate and load debris		20,000.00	CY	1.30	26,000	
	Haul building debris		20,000.00	CY	0.75	15,000	
	Landfill fee, building debris, assuming non-hazardous		20,000.00	CY	5.25	105,000	
	SUBTOTAL BUILDING DEMOLITION					5,779,450	
	Add Building Demolition Contingency	5%				288,973	
	TOTAL BUILDING DEMOLITION						**6,068,423**
020 700	**Selective Demolition**						
	HVAC demolition						
	Sprinkler pump assemblies		29.00	EA	149.00	4,321	
	Boilers		105.00	EA	418.00	43,890	
	HW storage tanks		500.00	EA	60.00	30,000	
	Furnaces		183.00	EA	153.00	27,999	
	Other mech equipment	estimated	1.00	LS	2,000.00	2,000	
	Haul HVAC debris		2,000.00	CY	1.50	3,000	
	Landfill fee, HVAC debris		2,000.00	CY	5.25	10,500	
	CMU demolition						
	Walls, medical complex		43,200.00	SF	0.73	31,536	
	Building chimneys		230.00	EA	150.00	34,500	
	Incinerator chimneys	estimated	2.00	EA	5,000.00	10,000	
	Haul CMU debris		2,500.00	CY	1.50	3,750	
	Landfill fee, CMU debris		2,500.00	CY	5.25	13,125	
	SUBTOTAL SELECTIVE DEMOLITION					214,621	
	Add Selective Demolition Contingency	5%				10,731	
	TOTAL SELECTIVE DEMOLITION						**225,352**

Ft. Chaffee Building Removal **Cost Analysis** **April 2000**

CSI	ITEM		QUANTITY	UNITS	UNIT PRICE	BARE TOTAL	
020 750	**Concrete removal**						
	Footings and Foundations		27,500.00	CY	15.00	412,500	
	Slabs on grade		24,300.00	CY	15.00	364,500	
	Misc. site structures; slabs, washracks, truck ramps		12,000.00	CY	15.00	180,000	
	Haul concrete debris	assume stockpiled	95,700.00	CY	0.75	71,775	
	Landfill fee, concrete debris	on-site and will not be landfilled	95,700.00	CY		0	
	SUBTOTAL CONCRETE REMOVAL					1,028,775	
	Add Concrete Removal Contingency	10%				102,878	
	TOTAL CONCRETE REMOVAL						**1,131,653**
020 800	**Hazardous Mat'l Abatement**						
	Remove ACBM	per SF of building	2,590,000.00	SF	1.75	4,532,500	
	Air monitoring / testing	all tests	300.00	DAY	426.00	127,800	
	Remove fluorescent fixtures		1,000.00	EA	13.00	13,000	
	Remove Hg therm'sts, switches		200.00	EA	9.40	1,880	
	Haul ACBM		2,273.00	CY	2.35	5,342	
	Landfill fee, ACBM		2,273.00	CY	55.00	125,015	
	Dispose fluorescent fixtures	incl ballasts & tubes	1,000.00	EA	4.24	4,240	
	Dispose Hg thermostats		1.00	BRL	3,024.00	3,024	
	SUBTOTAL HAZARDOUS MATERIAL ABATEMENT					4,812,801	
	Add Haz Mat'l Abatement Contingency	5%				240,640	
	TOTAL HAZARDOUS MAT'L ABATEMENT						**5,053,441**
022 200	**Excavation / backfill**						
	Furnish and place topsoil		50,000.00	CY	14.00	700,000	
	Rough grade to drain		2,900.00	CSY	2.00	5,800	
	SUBTOTAL EXCAVATION / BACKFILL					705,800	
	Add Excavation Contingency	10%				70,580	
	TOTAL EXCAVATION / BACKFILL						**776,380**
029 300	**Lawns and grasses**						
	Seed, machine spread		290.00	MSY	135.00	39,150	
	Add Lawns and Grasses Contingency	5%				1,958	
	TOTAL LAWNS AND GRASSES						**41,108**

Ft. Chaffee Building Removal **Cost Analysis** **April 2000**

CSI	ITEM		QUANTITY	UNITS	UNIT PRICE	BARE TOTAL	
TOTAL PROJECT DIRECT COST							**13,551,586**
	PROJECT CONTINGENCY	5% of Total Project Direct Cost					677,579
	SUBTOTAL						14,229,165
	GC OVERHEAD AND PROFIT	20% of Total Project Direct Cost incl Contingency					2,845,833
TOTAL PROJECT ESTIMATE							**17,074,998**

Appendix F: Salvage Unit Costs

ITEM		UNIT COSTS	
HVAC Components			
Remove radiators		11.00	EA
Remove heaters	gas	11.00	EA
	steam	11.00	EA
Remove ducts		0.05	LB
Remove steam / gas pipe		0.52	LF
Remove boiler		180.00	EA
Remove furnace		56.16	EA
Remove HW storage tank		11.00	EA
Plumbing Components			
Remove toilets		6.00	EA
Remove urinals	trough	11.00	EA
	wall hung	6.00	EA
Remove lavatories	china	6.00	EA
	cast iron	6.00	EA
Remove drinking fountain		6.00	EA
Remove supply piping	galv steel	0.20	LF
	copper	0.20	LF
Remove DWV	Cast iron	0.68	LF
Remove sprinkler system	pipe	0.30	LF
	pump	33.50	EA
Electrical Components			
Remove panel boxes		6.00	EA
Remove light fixtures, ceiling	Incandescent	3.33	EA
	Fluorescent	6.67	EA
Roof Construction			
Remove roof vents		8.50	EA
Remove eave / rake flashing		0.07	LF
Remove roofing		0.17	SF
Remove roof sheathing		0.09	SF
Remove rafters		0.13	BF
Remove trusses	> 50' span	0.09	BF
	45-50' span	0.65	LF
	40-45' span	0.11	LF
	25-30' span	0.06	LF
Remove columns	6x6	0.11	BF

	8x8	0.10	BF
Remove timber framing		0.06	BF
Interior Construction			
Remove finish ceiling	GWB, nailed	0.11	SF
	acoustic panels	0.04	SF
	T bar system	0.04	SF
	Galvanized steel	0.11	SF
Remove shower room panels		0.11	SF
Remove interior partitions		0.68	SF
Remove toilet partitions	painted steel	6.05	EA
Remove interior doors	metal frame	10.51	EA
	wood door	3.30	EA
	lockset	1.59	EA
	closer	2.44	EA
Exterior Closure			
Remove exterior siding	wood	0.09	LF
	metal, sheet	0.11	SF
	metal, lap	0.11	SF
Remove exterior sheathing	wood board	0.09	SF
	rigid insulation	0.05	SF
Remove personnel doors	metal frame	6.00	EA
	metal door	6.00	EA
	closer	2.44	EA
	lockset	1.59	EA
Overhead (coil) doors	10x10	16.37	EA
	14x14	32.75	EA
Remove exterior windows		8.41	EA
Remove wall framing	2x4	0.10	BF
	2x6	0.09	BF
Floor Construction			
Remove finish floor		0.05	SF
Remove subfloor		0.04	SF
Remove floor sheathing		0.09	SF
Remove floor framing	2x6/ 2x10	0.09	BF
	2x12	0.06	BF
	built-up	0.10	BF
Remove columns		0.11	BF
Masonry Construction	chimneys	124.50	EA
Steel Components	fire escapes	35.00	EA

Appendix G: "Cherry Picking" Cost Impact

	QUANTITY	UNITS	APPROX. SALVAGE COST	APPROX. SALVAGE VALUE
Exterior doors and hardware	1,000	EA	4,300	145,500
Interior doors, hardware	885	EA	9,900	84,000
Toilet partitions	135	EA	820	20,250
Plumbing fixtures (upgraded)	1,300	EA	4,200	99,500
Plumbing equipment (upgraded)	40	EA	440	8,000
HVAC equipment (upgraded)	15	EA	500	7,500
Electrical panels	150	EA	1,500	130,000
Structural steel shapes	52	T	200	3,200
TOTAL DIRECT COST			21,860	
ADD CONTINGENCY		10%	24,046	
ADD O&P		10%	26,451	
TOTAL VALUE				**497,950**
TOTAL COST			**26,451**	
NET VALUE / SAVINGS			**471,499**	

Appendix H: Salvage Cost Impact

	QUANTITY	UNITS	APPROX. SALVAGE COST	APPROX. SALVAGE VALUE	
Steel siding, canopies	350	T	0	0	*
Windows (new)	1,860	EA	94,000	152,000	
Exterior doors and hardware	1,000	EA	4,300	181,500	
Coil OH doors	90	EA	1,400	48,000	
Sheet metal, flashing, ducts	350	T	0	0	*
Interior doors, hardware	885	EA	9,900	95,000	
Acoustic ceiling panels	80,000	SF	7,200	55,000	
Toilet partitions	135	EA	820	20,250	
Plumbing fixtures (upgraded)	1,300	EA	4,200	137,400	
Cast iron	525	T	0	0	*
Steel pipe	328	T	0	0	*
Plumbing equipment (upgraded)	40	EA	440	8,000	
HVAC equipment (upgraded)	15	EA	500	7,500	
Copper pipe	8,000	LBS	0	0	*
Electrical panels	150	EA	1,500	40,950	
Light fixtures	3,300		25,100	90,000	
Structural steel shapes	80	T	1,300	4,800	
Concrete reinforcing	500	T	0	0	*
Bricks	1,300	M	0	13,000	
Cost avoidance (hauling and landfill)	38,000	CY	0	237,000	

*Salvageable, but not cost effective

TOTAL DIRECT COST		150,660	
ADD CONTINGENCY	10%	165,726	
ADD O&P	10%	182,299	
TOTAL VALUE			**1,090,400**
TOTAL COST		**182,299**	
NET VALUE / SAVINGS		**908,101**	

Appendix I: Deconstruction Cost Impact

	QUANTITY	UNITS		APPROX. DECONST. COST	APPROX. DECONST. VALUE
Buildings	2,534,000.00	SF		7,602,000	4,530,000
Cost avoidance (demolition)				0	5,400,000
Cost avoidance (hauling and landfill)	38,000	CY		0	1,400,000
TOTAL DIRECT COST				7,602,000	
ADD CONTINGENCY			10%	8,362,200	
ADD O&P			10%	9,198,420	
TOTAL VALUE					**11,330,000**
TOTAL COST				**9,198,420**	
NET VALUE / SAVINGS				**2,131,580**	

Note: Subsequent to the initial cost analysis, it was determined that siding is salvageable at a high value, and additional lumber from motor pool buildings is salvageable. Total deconstruction salvage value should be roughly $900,000 greater than the value/savings shown above.

Appendix J: Guide Request for Proposal

REMOVAL OF HOSPITAL BUILDINGS AT FORT CHAFFEE, AR

NOTE: AS CERL IS NOT AGENT TO THE FORT CHAFFEE REDEVELOPMENT AUTHORITY (FCRA), FINAL CONTENT OF AN RFP IS THE RESPONSIBILITY OF THE FCRA. CONSULTATION WITH AN ATTORNEY IS ENCOURAGED REGARDING THE AGREEMENT AND CONDITIONS OF THE CONTRACT.

FORT CHAFFEE REDEVELOPMENT AUTHORITY, FORT SMITH, ARKANSAS

DIVISION 00, CONTRACT REQUIREMENTS

00005 PROJECT INFORMATION

1. REQUEST FOR PROPOSAL.

   A. This document constitutes a Request for Proposal for:

      Project Name: Removal of Hospital Buildings

      Location: Fort Chaffee, AR

      Owner: Fort Chaffee Redevelopment Authority

2. PROJECT DESCRIPTION.

   A. Contract Scope:

      1. This project consists of removing 149 World War II vintage buildings from the Fort Chaffee property. Work includes, removing the buildings, removing above ground utilities and miscellaneous site appurtenances, and restoring the site's grade to its existing contours. A complete description of the contract scope appears in 02050, Demolition/Building Removal.

   B. Project Objectives:

      1. The Fort Chaffee Redevelopment Authority desires to remove the buildings in the most economical and efficient means practical, and to minimize adverse environmental impacts of demolition and waste disposal.

      2. Proposals are being solicited to encourage innovative approaches to remove the buildings, reduce the use of resources, reduce waste, and reduce the cost to the Fort Chaffee Redevelopment Authority. In addition to demolition, acceptable methods for removing the buildings may include, but are not limited to building relocation, deconstruction and salvage for reuse, recycling, and other methods that can reduce cost and adverse environmental effects.

   C. Who May Submit:

      1. The Fort Chaffee Redevelopment Authority intends to award one contract for all work described in this RFP.

2. Proposals may be submitted by firms formally organized to provide all required services.

3. Proposals may also be submitted by licensed contractors, specialty contractors, salvage and recycling industries, charitable organizations, private individuals, non-profit organizations such as schools, vocational programs, local housing agencies, or public arts programs that accept used building materials, or other interested parties who will collaborate specifically for this project.

4. For the purposes of this solicitation, no distinction is made between a formally organized entity and a project-specific association of multiple parties. Both are referred to as "proposer" before the award of a contract, and as "contractor" after the award.

D. Contract type: Single fixed-price contract.

E. Anticipated schedule:

RFP available:	_____ . [insert date]
Proposal submittal date:	_____ . [insert date]
Award date:	_____ . [insert date]
Substantial Completion:	_____ . [insert date]
Contract close-out:	_____ . [insert date]

3. SELECTION PROCESS

A. Basis of Award:

1. A contract will be awarded to the proposer offering the Most Favorable Terms to the Fort Chaffee Redevelopment Authority. Price, proposer qualifications and capabilities, proposed methods to remove the buildings and manage waste, management approach, and schedule will be considered in combination. Selection of a contractor will not be based on lowest price alone.

B. Summary of Proposal Requirements:

1. Proposals will consist of the following:

a) Price for performing the Work.
b) Statement of proposer qualifications and capabilities.
c) Description of the technical approach for the buildings' removal.

d) Debris and waste management plan.
e) Project management plan.
f) Schedule for completing the Work.

C. Summary of Evaluation Procedure:

1. The Fort Chaffee Redevelopment Authority, with their engineering consultant, will evaluate proposals according to the criteria described in 00200, Instructions to Proposers. Proposals will be evaluated on their own merits and rated individually.

2. Proposal evaluation will be conducted by the Fort Chaffee Redevelopment Authority, according to the procedures described in 00200, Instructions to Proposers. In summary, each proposal will be checked for general conformity to the requirements of this RFP. The proposer's qualifications, technical approach, and management plan will then be evaluated and rated. The proposed price, along with the qualifications / technical / management rating, will then be considered to determine the Most Favorable Terms for the Fort Chaffee Redevelopment Authority.

3. Selection may be made without further discussion. The Fort Chaffee Redevelopment Authority may also request clarifications and/or additional information from proposers. If discussions are held, Proposers will be given the opportunity to revise their proposals. See 00200, Instructions to Proposers.

4. PROJECT DOCUMENTS.

A. Available from: Fort Smith Redevelopment Authority.

5. GOVERNING REGULATIONS.

A. Regulations governing the acquisition of construction services for Sebastian County, Arkansas apply to this project.

6. PROPOSAL SECURITY.

A. Proposal security will be required as described in 00200, Instructions to Proposers.

End of Section 00005

00015 LIST OF DRAWINGS AND SCHEDULES

1. DRAWINGS AVAILABLE FROM THE OWNER

THE FOLLOWING DRAWINGS ARE AVAILABLE FROM THE FORT CHAFFEE BASE TRANSITION TEAM

A. Location Map:

B. Site Plans: Detailed Site Map, Building Use Plan, Area I

C. Building Plans: Power Plant Record Drawings

D. Utility Plans:

1. Water Distribution System Mains, Area J
2. Sanitary Sewer Collection System, Area H
3. Hospital Steam Distribution System, Vacuum Return Lines
4. Hospital Steam Distribution System, Medium Pressure Mains

THE FOLLOWING DRAWINGS ARE AVAILABLE FROM ARKANSAS OKLAHOMA GAS CORPORATION AND THE CORPS OF ENGINEERS LITTLE ROCK DISTRICT

5. Electrical Plan

THE FOLLOWING DRAWINGS ARE AVAILABLE FROM OKLAHOMA GAS AND ELECTRIC AND THE CORPS OF ENGINEERS LITTLE ROCK DISTRICT

6. Gas Distribution Plan

2. SCHEDULES AVAILABLE FROM THE OWNER

A. A Building Schedule appears on the Detailed Site Plan Building Use Map Area I. For each building it provides the building number, building type, and size in either dimension or square footage.

B. Appendix A provides a general description of the buildings' construction.

3. AVAILABILITY OF DOCUMENTS

A. This RFP may be obtained from:

Fort Chaffee Redevelopment Authority
P.O. Box 11921
Fort Smith, AR 72917
Tel: 501/452-4554
FAX: 501/452-4566

End of Section 00015

00200 INSTRUCTIONS TO PROPOSERS

1. PROJECT SCHEDULE

Advertisement:	_____ . [insert date]
RFP Available:	_____ . [insert date]
Pre-Proposal Meeting(s) / Site Visit(s):	_____ . [insert date]
Proposals Due:	_____ . [insert date]
Proposal Evaluation:	_____ . [insert date]
Award / Agreement:	_____ . [insert date]
Notice to Proceed:	_____ . [insert date]
Substantial Completion:	_____ . [insert date]
Contract Close-out:	_____ . [insert date]

2. REQUEST FOR PROPOSAL

A. The RFP document consists of:

1. Instructions to Proposers
2. The Proposal Form
3. The Agreement / Conditions of the Contract
4. The Agreement / Contract Form
5. Specifications
6. Description of Existing Conditions
7. Amendments

B. Amendments:

1. The Fort Chaffee Redevelopment Authority reserves the right to modify this RFP prior to the proposal due date. Such modifications will be issued by Amendment to all RFP holders.

2. If Amendments are of such a nature to require substantive changes in the scope of work or price proposed, the proposal due date may be postponed by such a time as, in the opinion of the Fort Chaffee Redevelopment Authority, will enable proposers to revise their proposals. In such case, the Amendment will include an announcement of the new proposal due date.

C. Proposal Opening:

1. Proposal evaluation will be conducted by the Fort Chaffee Redevelopment Authority.

2. Proposals will not be opened or evaluated publicly.

3. Proposal proceedings and results will be recorded and documented.

4. The Fort Chaffee Redevelopment Authority will publish an abstract of proposal results and proposed prices.

D. Discussions:

1. The Fort Chaffee Redevelopment Authority may request discussions with proposers to clarify proposals and/or obtain additional information. If discussions are held, proposers will be allowed to revise their proposals.

3. PROPOSALS

A. Submission, modification, revision, and withdrawal of proposals.

1. Submit **[2] [__]** copies of proposals to the Fort Chaffee Redevelopment Authority no later than 12:00 Central Standard Time, at **[insert street address]**.

2. On the first page or cover of the proposal, include the name, address, telephone and facsimile numbers, electronic address if available, and name and title of person authorized to negotiate on the proposer's behalf with the Fort Chaffee Redevelopment Authority in connection with this solicitation.

3. Enclose the Proposal Form **[and proposal security]** in a sealed, opaque envelope, independent of the proposal narrative material. Sign proposal forms manually.

4. Submit proposals in sealed, opaque envelopes or packages. Bind or bundle each copy of the proposal independently.

5. Electronic commerce or facsimile are not permitted.

6. Any proposal received at the designated location after the date and time specified may not be considered unless there is acceptable evidence that late receipt was caused by mishandling, delay, or interruption of services on the part of the United States Postal Service or commercial delivery service used to deliver the proposal.

7. Proposers may submit modifications to their proposals or correct a mistake at any time before the solicitation closing date and time. In-

clude a manually signed statement giving evidence of the modification's authenticity.

8. Proposals may be withdrawn any time before the solicitation closing date and time. Submit a written statement, manually signed, requesting withdrawal of the proposal.

B. Proposal expiration date. Proposals submitted in response to this solicitation are valid for **[60] [_]** days after the solicitation closing date and time.

C. Restriction on disclosure and use of data.

1. Proposers that include in their proposals data that they do not want disclosed to the public for any purpose, or used by the Fort Chaffee Redevelopment Authority except for evaluation purposes shall:

a) Mark the title page of the proposal with the following: "This proposal includes data that shall not be disclosed outside the Fort Chaffee Redevelopment Authority and shall not be duplicated, used, or disclosed in whole or in part for any purpose other than to evaluate this proposal. The data subject to this restriction are contained in sheets [insert referenced sheets or pages]."

b) Mark each sheet of data it wishes to restrict with the following: "Use of disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal."

2. Acceptance, Award, and/or Rejection:

a) The proposer proposes and agrees, if their proposal is accepted, to enter into an Agreement with the Fort Chaffee Redevelopment Authority in the form included in the RFP documents to perform all Work specified or indicated in the RFP documents for the contract price, within the contract times specified in their proposal, and in accordance with the terms and conditions of the contract documents.

b) The Fort Chaffee Redevelopment Authority intends to award a contract resulting from this solicitation to the responsible proposer whose proposal represents the Most Favorable Terms after evaluation in accordance with the factors described in this solicitation.

c) The Fort Chaffee Redevelopment Authority reserves the right to reject any or all proposals if proposals are incomplete, do not comply with the requirements of this RFP, are determined to be unrealistic in price or any of the proposal's provisions, or if rejection would otherwise be in the best interest of the Fort Chaffee Redevelopment Authority.

d) The Fort Chaffee Redevelopment Authority reserves the right to waive informalities and minor irregularities in proposals received.

e) A written notice of acceptance of the proposal issued by the Fort Chaffee Redevelopment Authority shall result in the execution of a binding contract without further action by either party.

D. Arithmetic discrepancies.

1. The Fort Chaffee Redevelopment Authority will resolve arithmetic discrepancies found on the face of the proposal form as submitted by proposers. These include obviously misplaced decimal points, apparent errors in extensions of unit prices, and apparent errors in addition of line items. These correction procedures will not be used to resolve any ambiguity concerning which price proposal is the lowest.

E. Submit the following as the proposal.

1. The Proposal Form included in this RFP.

2. Certifications and Representations required by this RFP.

3. Identification of all parties participating in the proposal. List the proposer, subcontractors, material or salvage outlets, and other businesses, organizations, or agencies participating in the proposal, including non-profit organizations. Indicate what responsibilities each party will have in performing the Work. Indicate whether the proposer and any subcontractor or other participants have had previous relationships on demolition or building removal projects.

4. Contractor Qualifications and Experience.

a) Provide **[three (3)] [five (5)]** references documenting the proposer's experience and past performance with projects similar to the Removal of Hospital Buildings at Fort Chaffee, AR. The past performance data provided should be relative to the most recent applicable projects. For each referenced pro-

ject, provide the project name, location, Owner, individual's name who can be contacted for project information, mailing address, phone number and, if applicable, e-mail address.

b) For each referenced project, indicate the project schedule requirements, as described in the project's contract, and whether demolition or building removal was accomplished within the required schedule. If the required project schedule was not met, provide an explanation.

c) For each referenced project, indicate the contract amount or funds budgeted by the Owner for demolition or building removal. Indicate whether the Work was performed within this amount. If the project was not completed within the established budget or contract amount, provide an explanation.

d) Describe any experience by the proposer, subcontractor, or proposal participant involving alternatives to demolition and landfilling debris. Such experience may include, but need not be limited to building relocation, deconstruction, materials' salvage, recycling, or other methods of building removal or waste diversion.

e) Indicate whether any of the following has been assessed against the proposer or any subcontractor or participant in the proposal by an Owner within the last **[three (3)] [five (5)]** years. Provide an explanation of each occurrence.

(1) Liquidated damages.

(2) Claims for corrective action or non-performance of Work.

(3) Lost time accidents.

(4) Workman's Compensation claims.

(5) Citations or fines by OSHA or the State of Arkansas for safety violations.

(6) Environmental violations.

(7) Disbarment.

5. Proposed Building Removal Methods.

a) Describe the activities and sequences proposed for removing the buildings. Describe the sequence in which the build-

ings will be removed. Describe the removal of building 3632 (the Recreation Building) and building 3670 (the Steam Plant, including boiler equipment and chimneys) individually.

b) Indicate which buildings, if any, will be removed and relocated.

c) Indicate which buildings, if any, will be deconstructed for salvageable materials.

d) Indicate how salvageable materials will be separated from demolition debris.

e) Describe the method proposed for removing foundations.

f) Describe the method proposed for terminating water, sanitary, gas, and steam utilities at the buildings' locations.

g) Describe the layout of the Work and use of the site. Indicate the following:

(1) Site protection, fencing, and access control.

(2) Employee access and parking.

(3) Areas used for equipment staging or maintenance.

(4) Work areas and areas used to stockpile salvaged materials.

(5) Haul routes.

(6) Describe the proposed methods for soil stabilization and erosion and sedimentation control during building removal.

(7) Identify the trees that will be removed. Describe the proposed methods of protecting trees from damage that are to remain.

(8) Describe the methods for the disposal of demolition debris and hazardous materials. Identify the landfill sites proposed for this project.

(9) Describe how the site will be graded and restored to existing contours upon removal of the buildings. Describe drainage courses and elevations, and plant materials used for surface stabilization.

6. Debris and Waste Management Plan.

a) Describe actions that will be taken to reduce the volume of demolition debris that will be disposed of in a landfill. Describe the following:

(1) Specific approaches proposed for salvage, reuse, and recycling materials. Include areas of the site and equipment to be used for processing, sorting, and temporary storage of debris and materials. Indicate whether covered facilities will be required for processing or handling recovered materials.

(2) Commercial salvage, recycling, or reuse businesses that will be utilized for this project. Identify the materials and quantities that will be taken by each business.

(3) Non-commercial reuse programs such as non-profit organizations, material exchange networks, housing agencies, charitable organizations, vocational education, individuals, and other programs that will be utilized for this project. Identify the materials and quantities that will be taken by such organizations.

(4) The types and quantities of materials that will be recovered for reuse or recycling.

(5) Materials and quantities that will not be recovered for reuse or recycling, and proposed methods of disposal.

7. Project Management Plan

a) Describe the methods the proposer will take to ensure completion of the Work described in this RFP and the proposal. Include the following:

(1) Labor and equipment resources requirements. Verify the required equipment will be available for this project at the times required by the proposed schedule. Identify required labor resources.

(2) Project schedule. Indicate how the proposed completion time will be accomplished. Include mobilization and demobilization time, building removal sequence or

phasing, filling and grading, and soil stabilization. Indicate any activities that will be performed outside the Hospital complex boundaries, such as processing or distributing salvaged materials. Indicate how the project's progress will be monitored and how the schedule will be updated throughout the progress of the Work.

(3) Safety plan. Include the following:

(a) The individual who will be responsible for safety management for any activities performed in connection with this project.

(b) Methods for hazard identification and communication.

(c) Required training and education, who is to receive training, and the source of training. Indicate if individuals who are not trained in construction trades will be present on the jobsite, and what training will be provided for them.

(d) Inspection plan for building removal activities, equipment, personal practices, and the jobsite.

(e) Record keeping and documentation.

(f) Accident response plan.

F. Proposal Process:

1. Proposals will be evaluated by Fort Chaffee Redevelopment Authority [*insert titles of personnel*] and their engineering consultants.

2. Evaluation procedures are as follows:

a) Each proposal will be evaluated individually. Proposals will be evaluated according to the criteria described in this RFP and not directly compared to other proposals.

b) Proposals will be checked for completeness and general conformity with the provisions of this RFP.

c) Proposals will be evaluated for proposer qualifications, technical approach for the buildings' removal, debris and waste management plan, and project management capabili-

ties, and time for completing the Work. Each proposal will be rated for its qualities in each evaluation area.

d) Each proposal's price will be evaluated.

e) A cost / quality trade-off evaluation will be performed to determine the overall Most Favorable Terms to the Fort Chaffee Redevelopment Authority. Price and other qualities will be considered together. Selection will not be based solely on lowest proposed price.

3. The Fort Chaffee Redevelopment Authority intends to evaluate proposals and award a contract without discussions with proposers. Therefore, each proposer's initial proposal should contain the proposer's best terms from a price and technical standpoint. The Fort Chaffee Redevelopment Authority reserves the right to conduct discussions if it determines discussions are necessary or beneficial.

a) The Fort Chaffee Redevelopment Authority reserves the right to limit discussions to proposers within a competitive range of the most highly rated proposals.

b) Discussions may involve clarification or request for additional information. Discussions will be confined to the proposal in question. Other proposals' contents will not be disclosed or discussed.

c) If discussions are held, proposers will be allowed to revise their proposals in either price or content.

d) The final selection judgment and authority resides with the Executive Director of the Fort Chaffee Redevelopment Authority.

4. SELECTION CRITERIA

A. The Fort Chaffee Redevelopment Authority will select a contractor based on the following criteria, in descending order of priority.

1. Price.
2. Proposer qualifications.
3. Building removal methods.
4. Waste management plan.
5. Project management plan.
6. Project schedule.

B. Specific elements of these criteria are as follows.

1. Price. The cost to the Fort Chaffee Redevelopment Authority will be evaluated. Lower price will be rated more favorably.

2. Proposer qualifications.

a) Experience with similar projects. The scope, types of buildings removed or demolished, time constraints, environmental conditions of the referenced projects will be evaluated. Experience with building relocation, deconstruction and materials recovery or salvage, and recycling will be evaluated. Experience with projects with greater similarity to the Removal of Hospital Buildings at Fort Chaffee will be rated more favorably. Experience with alternatives to demolition will be rated more favorably.

b) Record of successful performance. Successful completion of demolition or building removal projects within budget, time constraints, and the Owners' expectations will be rated more favorably.

c) Safety record. Occurrence of lost time accidents, results of OSHA or State of Arkansas safety inspections and record of citations, and Workman's Compensation Experience will be evaluated. Occurrence of accidents or safety violations will be rated less favorably.

d) Previous relationships. Working relationships of proposal participants will be evaluated. Participants who have successfully worked together on previous projects will be rated more favorably.

3. Building removal methods.

a) Building removal plan. The activities and sequence of removing the buildings, utilities termination and foundation removal, removal of debris, and grading will be evaluated. Proposals that exhibit greater innovation, efficiency, and economy in removing buildings and restoring the site to existing grade will be rated more favorably.

b) Site protection. Proposed removal of trees and shrubs, protection of desirable vegetation, erosion and sedimentation control, and stabilization of disturbed areas will be evaluated. Proposals that reduce site disturbance and environmental

degradation, and therefore the cost of repair, will be rated more favorably.

c) Work layout. Traffic access, site protection, layout of work and stockpile areas, hauling routes, and equipment maintenance areas will be evaluated. Activities that minimize disturbance to the site and adjacent areas and activities will be rated more favorably.

4. Waste management. Proposed methods for reusing, recycling, and disposing of materials will be evaluated. Proposals that economically maximize the quantity of recovered and recycled materials, and minimize the quantity and cost of debris to be land filled will be rated more favorably.

5. Project management. Availability of equipment and other resources proposed for this project, methods to monitor and maintain the schedule, methods to monitor conformance to the contract documents, and plan to maintain a safe working environment will be evaluated. A project management strategy that exhibits the most effective control over this project's completion within cost, time, safety, and quality expectations will be rated more favorably.

6. Project schedule. The proposed duration, substantial completion, and close-out times or dates will be evaluated. Any features of the proposal's plans that suggest the project site may not be cleared by the specified date will be rated less favorably.

5. TERMS AND PROCEDURES

A. Copies of Documents:

1. The Fort Smith Redevelopment Authority will issue this RFP to contractors, subcontractors, salvage or recycled outlets, charitable organizations, and other parties interested in participating in this solicitation.

2. The Fort Smith Redevelopment Authority will maintain a record of parties **[requesting this RFP] [to whom this RFP is issued]**, and will make this list available upon request.

3. The Fort Smith Redevelopment Authority is not responsible for errors or misinterpretations resulting from the use of incomplete copies of this RFP.

4. The Fort Smith Redevelopment Authority makes copies of this RFP available only for the purpose of obtaining proposals for the Removal of Hospital Buildings at Fort Chaffee, AR, and does not confer any license or grant for any other use.

B. Questions during Proposal Development Period:

1. Direct all questions about the intent or contents of this RFP to:

Mr. Phillip G. Reeves, at the address given in 00005, Project Information.

2. Interpretations or clarifications in response to questions received prior to the proposal due date may be issued by Addenda to all parties recorded as having received this RFP, if considered necessary by the Fort Chaffee Redevelopment Authority.

3. Questions received less than **[5] [** ___ **]** days prior to the proposal due date may not be answered.

4. Only formal written responses to questions issued by letter or Addenda are binding. Oral and other interpretations or clarifications are not binding.

C. Pre-Proposal Meetings / Mandatory Site Visits:

1. A pre-proposal meeting will be held at **[** _____ **]**, on **[** _____ **]** 2000, **[** _____ **]** Central Standard Time. An agenda will be provided at the meeting.

2. A site tour will be conducted immediately following the pre-proposal meeting.

3. Proposers are required to examine the site prior to submitting a proposal.

4. Prospective proposers are encouraged to submit questions in writing to the Fort Chaffee Redevelopment Authority no later than **[2] [** ___ **]** days prior to the pre-proposal meeting.

5. Minutes of the pre-proposal meeting will be prepared and distributed to RFP holders as an Addendum. Minutes will include summaries of questions, responses provided at the meeting, and clarifications or interpretations developed subsequent to the meeting in response to questions presented at the meeting.

D. Information Relating to Existing Conditions:

COORDINATE WITH THE BTT ON REQUESTING AND OBTAINING DOCUMENTS.

1. Certain reports and data on the existing conditions of the Fort Chaffee Hospital Site reside with the Fort Chaffee Base Transition Team. Such information may be requested in writing from the Fort Chaffee Redevelopment Authority.

2. These documents are not part of this RFP. The proposer is responsible for any interpretation or conclusion drawn from such reports or data.

E. Supplementary Investigations by Proposers: Before submitting a proposal, each proposer will be responsible for obtaining such additional or supplementary examinations, investigations, explorations, tests, studies, or data concerning conditions at or contiguous to the site or otherwise which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, or procedures of construction to be employed by the proposer and safety precautions and programs incident thereto, or which the proposer deems necessary to prepare its proposal for performing the Work in accordance with the terms and conditions of the contract documents.

F. Access to Site by Proposers: On request, the Fort Chaffee Redevelopment Authority will provide each proposer access to the site to conduct such examinations, investigations, explorations, tests, and studies as each proposer deems necessary for submission of a proposal. The proposer must fill all holes and clean up and restore the site to its former condition upon completion of such investigations.

G. Availability of the Site for Work:

1. The buildings to be removed are in the area bounded by 25th Street, East Hospital Street, Arkansas Boulevard, and West Hospital Street.

VERIFY LOCATION OF BORROW/SPOIL AREAS, ADJACENT WORK AREAS, AND COVERED FACILITIES AVAILABLE TO THE CONTRACTOR

2. Borrow and spoil areas are indicated on the site plans.

3. **[** _____ **]** is available to the contractor for the purposes of temporarily stockpiling and processing salvaged materials. If the proposer intends to sell salvaged material to the public, they may do so from this location.

H. Tax Liability: The contractor will be liable for, or exempt from Federal, State, and Local taxes as described in 00800, Supplementary Conditions.

I. Permit Information: The contractor will be responsible for obtaining all necessary permits, as required by 00800, Supplementary Conditions.

J. Liquidated Damages: The contractor will be assessed liquidated damages, as described in 00800, Supplementary Conditions.

K. Proposal Security:

1. Proposal security in amount of **[_____ percent of the proposal price]** [_____] is required to accompany the proposal.

THE FOLLOWING PARAGRAPH REFERENCES EJCDC 1910-8 (1996 EDITION) STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT. REVISE THE REFERENCE IF DIFFERENT GENERAL CONDITIONS ARE INCORPORATED INTO THIS RFP.

2. Proposal security may be in the form of a **[certified cashier's check] [surety bond] [_____].** Surety bonds must be issued by a surety meeting the requirements of the Licensed Sureties and Insurers clause of the General Conditions of the Contract.

3. The proposal security of the selected proposer will be retained until such proposer has executed the Agreement, furnished the required contract security, and met other conditions of the Notice to Proceed, whereupon the proposal security will be returned.

4. The proposal security of proposers whose proposals are not selected will be returned within **[___]** days after the Agreement with the selected proposer is executed.

5. If the selected proposer fails to execute the Agreement, that proposer shall forfeit their proposal security.

L. Receipt of Amendments:

1. Acknowledge receipt of Amendments by citing each Amendment on the Proposal Form.

2. Verbal or telephonic conversations are not binding as the formal acknowledgement of receipt.

3. Failure to acknowledge receipt of all Amendments may be cause for disqualification from this solicitation.

M. Execution of Agreement: The Fort Chaffee Redevelopment Authority will issue a Notice of Award to the selected proposer, accompanied by the required number of unsigned copies of the Agreement.

1. Sign and deliver the required number of copies of the Agreement and the required contract security within **[___]** days of the issue of the Notice of Award.

2. Within **[___]** days of receipt of the signed Agreement and contract security, the Fort Chaffee Redevelopment Authority shall deliver to the contractor one copy of the fully signed Agreement.

N. Performance Bond: A Performance Bond will be required of the contractor, as described in 00600, Bonds and Certificates.

O. Payment Bond: A Payment Bond will be required of the contractor, as described in 00600, Bonds and Certificates.

End of Section 00200.

00400 PROPOSAL FORM

SOLICITATION NUMBER:

TITLE: Removal of Hospital Buildings, Fort Chaffee, AR

OPENING: DATE:
TIME: 12:00 Noon
PLACE: Fort Chaffee Redevelopment Authority
_____
Fort Smith, AR _____

MAIL SEALED PROPOSALS TO: Fort Chaffee Redevelopment Authority
_____
Fort Smith, AR _____

ON OUTSIDE OF PROPOSAL SHOW: (1) Return address
(2) Proposal opening date
(3) Proposal number & title

PROPOSER MUST COMPLETE THE FOLLOWING INFORMATION:

NAME OF PROPOSER: _____

ADDRESS: _____

CITY/STATE/ZIP CODE: _____

TELEPHONE NUMBER: _____

INSTRUCTIONS:

1. Return two copies of Section I (Cover Sheet), Section II (Proposal), and any other documents required by the specifications.
2. Acknowledge receipt of amendments by listing the number and date of each amendment number and items amended.
3. Proposals must be signed to be accepted.
4. Bidding procedures will be in compliance with Arkansas Laws.

00400 PROPOSAL FORM

PROPOSAL NO. SECTION II

We, the undersigned, agree to furnish the products and/or services indicated below in accordance with the specifications and conditions herein, and the proposed price shown.

It is expressly agreed and understood by and between the parties hereto, and is made a condition precedent to the entering into of any purchase agreement resulting from this Request For Proposal, that the Fort Chaffee Redevelopment Authority shall determine any and all questions or disputes which may arise concerning conformity to the specifications and conditions, and proposals; and the quantity, suitability, and acceptability of all items to be furnished hereunder; and their decision as to such matters shall be final, binding, and conclusive upon the parties hereto.

At this Request For Proposal and proposals submitted hereunder shall be governed by the laws of the State of Arkansas.

We, the undersigned, affirm that this proposal is made on behalf of the undersigned and is made without collusion on the part of any person, firm, or corporation; and that the conditions and other provisions have been carefully examined and are agreed to.

A. Proposed Price

B. Sales Tax

C. Total Price

D. Proposed Schedule:

Begin Work within _____ calendar days after Notice to Proceed.

Substantial Completion, as described in 00800 Supplemental Conditions, within _____ calendar days after Notice to Proceed.

Complete punch list and pre-final inspection within _____ calendar days after Notice to Proceed.

Complete and vacate site within _____ calendar days after Notice to Proceed.

E. Unsolicited alternatives in exception to the specifications: No ____ / Yes ____. (Attach descriptions)

F. Exhibits Attached:

Proposal Security
List of Principal Entities
Statement of Qualifications
Proposed Building Removal Methods
Proposed Waste Management Plan
Unsolicited Alternatives

_____
_____

FROM: _____

SIGNATURE: _____

(Type or print name)

TITLE: _____

_____

End of Section 00400.

00490 ADDENDA

[Insert number & date of issue of each Amendment]

End of Section 00490.

00500 AGREEMENT AND CONDITIONS OF THE CONTRACT

[Include applicable General Conditions]

NOTE: CONTRACT CLAUSES MUST BE COORDINATED WITH THE SUPPLEMENTARY CONDITIONS AND GENERAL REQUIREMENTS TO PREVENT REDUNDANCY, CONFLICT, OR OMISSION. THE FOLLOWING IS OFFERED FOR CONSIDERATION:

ENGINEERS JOINT CONTRACT DOCUMENT COMMITTEE (EJCDC)

- *1910-8-A-1, STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR WHERE THE BASIS OF PAYMENT IS A STIPULATED SUM*
- *1910-8, STANDARD GENERAL CONDITIONS FOR THE CONSTRUCTION CONTRACT*

CONSULTATION WITH AN ATTORNEY IS ENCOURAGED WITH RESPECT TO THE USE OR MODIFICATION OF THESE DOCUMENTS.

End of Section 00500.

00600 BONDS AND CERTIFICATES

1. A performance and payment bond in an amount equal to the contract amount is required per Title 14-44-503 of the Arkansas Code. Bond shall be furnished no later than ten (10) days after Notice of Award. Bond shall be executed by a solvent corporate surety company authorized to do business in the State of Arkansas. The bond shall be conditioned that the contractor shall faithfully perform their contract and shall pay all indebtedness for labor and materials furnished or performed in the project. Bond date cannot be earlier than the contract date.

End of Section 00600.

00800 SUPPLEMENTARY CONDITIONS

NOTE: SUPPLEMENTARY CONDITIONS MUST BE COORDINATED WITH THE SELECTED AGREEMENT AND GENERAL CONDITIONS TO PREVENT REDUNDANCY, CONFLICT, OR OMISSION.

1. COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK

A. Commence the Work under this contract within 10 calendar days after the issuance of a Notice to Proceed.

B. Perform the Work to a state of sustentative completion no later than **[__]** calendar days after the Notice to Proceed, or the time shown on the contractor's proposal, whichever occurs first. Substantial completion is defined as removal of all trees, bushes, and shrubs designated for removal, removal of all above grade utilities, termination and cover of underground utilities at grade, removal of all buildings and foundations at grade, rough grading, and substantially all finished grading. All final grading, punch list items, clean-up, demobilization, removal of fences and temporary facilities, and final sodding or seeding need not be completed.

C. Complete all Work and vacate the site no later than **[___]** days after receipt of the Notice to Proceed, or the time shown on the contractor's proposal, whichever occurs first.

D. Provide close out submittals no later than **[___]** days after receipt of the Notice to Proceed.

2. LIQUIDATED DAMAGES

A. If the contractor fails to complete the work within the time specified in the contract, including any extension which modifies the contract, the contractor shall pay to the Fort Chaffee Redevelopment Authority as liquidated damages the sum of **[_____]** per each calendar day of delay.

B. If the Fort Chaffee Redevelopment Authority terminates the contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the Work together with any increased costs occasioned the Fort Chaffee Redevelopment Authority in completing the Work.

3. RECORD DOCUMENTS

A. Provide documents describing the condition of the site upon removal of the utilities, buildings, and foundations at grade, and final grading to drain. Submit site plans displaying the following:

1. Roads, streets, parking aprons, sidewalks, building slabs, and other paved or hardstand surfaces. Indicate the paving or hardstand materials.

2. Site contours, including elevations, catch basins, culverts, and other drainage structures and features.

3. Utility plans, showing the location of where each water, sanitary, gas, steam, and other underground utility is terminated at grade. Indicate where any underground utilities were removed, terminated, or otherwise modified from the condition shown on the utility drawings provided with this RFP.

4. Trees over **[6] [___]** inches in diameter at a height of five feet above grade.

B. Submit as-built site drawings as either new drawings, or as reproductions of the RFP drawings on which the final site conditions are clearly indicated.

4. UTILITIES

A. All utilities within the site boundaries are inactive. The location of water and electrical services are shown on the site utility plans.

B. The contractor is responsible for providing all utilities necessary to perform the Work at their own expense.

C. No utility services may be interrupted by the contractor to make connections or any other purpose without approval from the utility provider and the Fort Chaffee Redevelopment Authority.

D. Washrooms and toilets in adjacent buildings may not be used.

E. Before final acceptance of the Work by the Fort Chaffee Redevelopment Authority, remove all temporary connections, distribution lines, meters, and associated devices.

5. IDENTIFICATION OF EMPLOYEES. Furnish an identification badge / card to each employee prior to the employees work on-site, and require each employee engaged on the Work to display identification. Cancel the identification upon release of the employee.

6. CONTRACTOR-PREPARED SCHEDULE

A. Prepare a detailed bar chart identifying the activities, sequences, and start and finish dates involved in performing the Work. Provide this schedule to the Fort Chaffee Redevelopment Authority within **[10] [___]** calendar days after the Notice to Proceed has been issued.

B. At intervals of **[7] [14]** calendar days, submit a report identifying the activities or portions of activities performed during the reporting period.

1. Identify the total value of that Work as the basis for the contractor's invoice for payment.

2. Describe the Work scheduled and the Work actually completed. Indicate the progress along the critical path in terms of days ahead or days behind the schedule.

3. Describe in narrative any current or anticipated delays, impacts on the schedule, corrective actions taken or proposed, and other information relevant to maintaining progress of the Work.

4. Provide an updated scheduled indicating the activities completed and schedule for the remainder of the Work.

7. WARRANTY

A. The contractor warrants, except as provided in paragraph F. of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in design, material, or workmanship performed by the contractor or any subcontractor, supplier, or service at any tier.

B. This warranty shall continue for a period of one (1) year from the date of final acceptance of the Work. If the Fort Chaffee Redevelopment Authority takes possession of any part of the Work before final acceptance, this warranty shall continue for a period of one (1) year from the date the Fort Chaffee Redevelopment Authority takes acceptance.

C. The contractor, at their own expense, shall remedy any failure to conform to contract requirements, any defect in materials or workmanship, or any damage to public or private property inflicted in connection with the performance of this contract.

D. The Fort Chaffee Redevelopment Authority shall notify the contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage. Following written notification by the Fort Chaffee Redevelopment Authority, the contractor shall respond to warranty service requirements within **[five (5)] [ ]** working days and work continuously to completion or relief.

E. If the contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the Fort Chaffee Redevelopment Authority shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the contractor's expense.

THE FOLLOWING PARAGRAPH REFERENCES EJCDC 1910-8 (1996 EDITION) STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT. REVISE THE REFERNECE IF DIFFERENT GENERAL CONDITIONS ARE INCORPORATED INTO THIS RFP.

F. This warranty shall not limit the Fort Chaffee Redevelopment Authority's rights under the TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK clause of this contract with respect to latent defects, gross mistakes, or fraud.

G. The contractor's performance bond will remain effective throughout the construction warranty period and warranty extensions.

8. PROJECT SIGN

A. Furnish and erect a project sign at the **[southeast corner] [_____]** of the site visible to **[_____]**. Display the following:

1. Project title.

2. Fort Chaffee Redevelopment Authority name and logo.

3. Names of the contractor and each subcontractor and other partner or party to this contract.

4. Name and logo of any charitable organization or agency participating in this contract.

B. Plumb and support the sign to maintain proper position, and maintain the sign in good condition throughout the duration of the contract. Remove the sign at the completion of the work performed under the contract.

9. INTERFERENCE WITH TRAFFIC ON PUBLIC AND PRIVATE PROPERTY

A. Conduct work in such a manner as to cause as little interference as possible with private and public travel. Damage to roads other than normal wear and tear shall, at the contractor's expense, be repaired to the satisfaction of the authority having jurisdiction over the roadway.

B. Haul routes are available to the Fort Smith municipal landfill within the Fort Chaffee property. Traffic confined to Fort Chaffee property is not subject to the regulatory constraints of public roadways.

C. Provide and maintain proper barricades or fences and take such other precautions as may be necessary to protect life, property, and structures. The contractor shall be liable for and hold the Fort Chaffee Redevelopment Association harmless from all damages occasioned in any way by their neglect, or that of their agents, employees, or workmen.

10. SALES AND USE TAX

A. The Contractor is subject to all sales tax.

11. INSURANCE

A. Supply a Certificate of Insurance for liability covering the Contractor and Fort Chaffee Redevelopment Authority within **[10] [** ___ **]** days after issuance of the Notice to Proceed. Insurance shall be effective for the time coverage of this contract. Minimum coverage shall be [$1,000,000.00] [_____].

12. TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

A. In order for the Fort Chaffee Redevelopment Authority to grant a time extension for unusually severe weather, the following conditions must be satisfied.

1. The weather experienced at the project site during the contract period must be found to be more severe than the adverse weather anticipated for the project location during any given month based on Na-

tional Oceanic and Atmospheric Administration (NOAA) or similar data.

2. The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the contractor.

THE FOLLOWING PARAGRAPH REFERENCES EJCDC 1910-8 (1996 EDITION) STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT. REVISE THE REFERENCE IF DEFFERENT GENERAL CONDITIONS ARE INCIRPORATED INTO THIS RFP.

From the time the Notice to Proceed is issued, and continuing throughout the contract, record the occurrence of adverse weather and the resultant impact to the work scheduled. If the number of actual adverse weather delays exceeds the anticipated number, notify the Fort Chaffee Redevelopment Authority within one (1) working day after the Work resumes, indicating the occurrence of the delay and impact on the schedule. The Fort Chaffee Redevelopment Authority shall issue a modification in accordance with: B. Article 12 CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIME of the General Conditions of the Contract.

13. FIRE PROTECTION. Comply with NFPA 241, Building Construction and Demolition Operations.

14. AVAILABILITY OF SAFETY MANUALS AND DATA

A. Provide a current copy of applicable OSHA safety manuals and guidelines at the project site. Communicate to all employees where these documents are located and how they are to be used.

B. Provide a Material Safety Data Sheets (MSDS) at the project site for each hazardous or toxic material brought onto the site, present on the site, or removed from the site. Communicate to all employees where MSDS are located and how they are to be used.

15. CONSTRUCTION HAZARD COMMUNICATION. Comply with 29 CFR 1926.59 OSHA Hazard Communication Standard.

16. CONTRACT ORDER OF PRECEDENCE.

A. This contract constitutes and defines the entire agreement between the contractor and Fort Chaffee Redevelopment Authority. In the event of conflict

or inconsistency between any of the provisions of this contract, precedence shall be given in the following order.

1. The solicitation, which includes all elements of this Request for Proposal and its Amendments.

2. Contractor's proposal, including additional work or features exceeding the minimum requirements of the solicitation.

3. The Agreement, including all specifications, plans, studies and analyses, submittals, and as-built documents provided by the contractor and approved by the Fort Chaffee Redevelopment Authority.

4. Modifications to the Agreement.

B. Failure of the Fort Chaffee Redevelopment Authority to detect features of the contractor's proposal or any specifications, plans, studies and analyses, submittals, and as-built documents provided by the contractor that do not conform to the solicitation, does not relieve the contractor from their obligation to conform to all elements of the Agreement.

17. MEETINGS AND CONFERENCES. Hold review conferences at intervals not to exceed **[7] [14]** calendar days at the **[contractor's field office] [Fort Chaffee Redevelopment Authority office]**.

End of Section 00800.

DIVISION 01, GENERAL REQUIREMENTS

01400 CONTRACTOR QUALITY CONTROL

Part 1, General (Not applicable)

Part 2, Products (Not applicable)

Part 3, Execution

1. GENERAL REQUIREMENTS.

Establish and maintain a quality control system consisting of plans, procedures, and organization necessary to accomplish the Work in compliance with the contract requirements. Include all building removal operations, both on-site and off-site.

2. QUALITY CONTROL PLAN.

A. Submit to the Fort Chaffee Redevelopment Authority, for their review, a Contractor Quality Control (CQC) plan within [10] [_____] calendar days after receipt of the Notice to Proceed. Include, as a minimum, the following elements in the CQC plan.

1. Identification of a Quality Control Officer for the project, individuals who will be performing inspection and quality control tasks, and lines of authority among all subcontractors, services, organizations, and other entities performing the Work.

2. List of definable features of the Work, which consists of each separate and distinct task or activity. Key each definable feature of the Work to the building removal sequence.

3. Methods of control, inspection, verification, and/or testing that will be applied to each definable feature of the Work. Include, as a minimum, the following elements.

a. Applicable drawings, specification paragraphs, standards and/or criteria, and test method.

b. Personnel participating in the inspection, physical examination, or testing procedures.

c. Methods of inspection or physical examination that will be performed during the task or activity. Include site conditions, materials, building removal operations and activities, and equipment in the inspection methods.

d. Testing laboratories or agencies used by the Contractor.

e. Description of known or potential hazards, hazard communications measures, applicable regulations, and hazard mitigation measures.

f. Documentation of the inspection, physical examination, or verification activity, including signatures of the contractor's Quality Control Officer and other participants in the activity.

4. Submittal register, keyed to each submittal requirement of the specifications.

5. Procedures for tracking deficiencies from identification through corrective action.

6. Procedures for resolving disputes.

B. No explicit approval of the CQC Plan will be issued by the Fort Chaffee Redevelopment Authority. The Fort Chaffee Redevelopment Authority reserves the right to return the CQC Plan to the Contractor with comments, and to require revisions to the CQC Plan if necessary to obtain the specified quality of Work.

C. After commencement of the Work, notify the Fort Chaffee Redevelopment Authority of any proposed changes in the CQC plan. Proposed changes are subject to the Fort Chaffee Redevelopment Authority's acceptance.

3. TESTING.

A. Verify the testing laboratories used by the contractor are conducting tests and reporting results in accordance with the contract. Verify the following.

1. That the testing laboratory is certified or accredited to perform the specified tests.

2. That tests are performed in accordance with the specified test procedures.

3. That testing equipment is calibrated.

4. That results of all tests are reported and included in the CQC report.

4. CONTRACTOR QUALITY CONTROL.

A. Conduct inspections, physical examination, required tests, and other verification activities on an ongoing basis until the completion of the particular feature of the Work. Describe the schedule, time, and/or frequency of inspections in the CQC Plan.

B. Record the results of each inspection, examination, laboratory test, or other verification activity performed. Identify any deficiencies detected, corrective action that will be taken, and the time in which deficiencies will be corrected.

5. QUALITY ASSURANCE.

A. Submit to the Fort Chaffee Redevelopment Authority, for their review, one copy of the report documenting the result of each inspection, examination, laboratory test, or other verification activity performed.

B. The Fort Chaffee Redevelopment Authority reserves the right to perform independent inspections, physical examinations, or tests. Upon request, provide duplicate samples of test specimens.

6. COMPLETION INSPECTION.

A. At the time of substantial completion of the Work, submit to the Fort Chaffee Redevelopment Authority a punch list of items which do not conform to the contract. Describe the nature of each deficiency, the corrective action that will be taken, and the time in which the deficiencies will be corrected.

B. Upon completion of the Work, the Fort Chaffee Redevelopment Authority will conduct a Pre-Final Inspection to verify that the Work is complete and that all punch list items have been resolved. Any remaining deficiencies shall be corrected within the required time to complete the Work, as proposed by the proposer and incorporated into the Contract.

C. The contractor's Quality Control Officer, with the Fort Chaffee Redevelopment Authority shall perform a Final Acceptance Inspection. The Final Acceptance Inspection will be scheduled by the Fort Chaffee Redevelopment Authority based on the results of the Pre-Final Inspection and schedule for completing all punch list items.

01500 TEMPORARY FACILITIES AND CONTROLS

Part 1, General

1. REFERENCES

29 CFR 1926 Safety and Health Regulations for Construction

2. PROTECTION AND MAINTENANCE OF TRAFFIC

A. Maintain and protect traffic on all affected roads throughout performance of the Work. Protect Fort Chaffee personnel and the traveling public from damage to person and property. Erect and maintain warning signs and devices as required by the State of Arkansas and Sebastian County.

B. Erect and maintain temporary barricades to limit public access to the project site.

3. TEMPORARY PROJECT SAFETY FENCING

A. Maintain the existing fence surrounding the project site through the performance of the Work.

4. CONTRACTOR'S TEMPORARY FACILITIES

A. Provide and maintain an administrative field office within the project site. The contractor may use an existing vacant building in lieu of a jobsite trailer if the building is made free from all hazards.

B. Provide potable water at the project site.

C. Provide and maintain field-type sanitary facilities at the project site. Toilet facilities in adjacent buildings are not available to contractor personnel.

D. Provide and maintain telephone service on the project site.

E. Provide parking for employees within the site boundaries or areas so designated as available to the contractor. Prevent interference of traffic on the Fort Chaffee property by employee parking.

F. Confine storage and operation areas to the project site and areas so designated on the site plans.

1. Where storage and operational areas are not established roadways or hardstand, cover these areas with a layer of gravel as necessary to prevent rutting and tracking mud onto roadways.

2. Maintain storage and operational areas in a neat and orderly manner.

3. Provide a 6 foot high chain link fence around **[contractor's administrative field office]** and areas used for the staging or storage of equipment, and areas used for processing and storing salvaged materials. Park mobile equipment within fenced areas at the end of each work day.

4. The contractor is responsible for the security of its own equipment and facilities.

6. REMOVAL OF TEMPORARY FACILITIES

A. Upon completion of the Work, remove all temporary facilities.

B. Fill holes and excavations. Protect exposed soil with seeding or the appropriate erosion control method.

C. All temporary construction will become property of the contractor.

D. Remove gravel placed to protect storage and operational areas. Restore these areas in their original condition, including topsoil and seeding if necessary.

Part 2, Products (NOT USED)

Part 3, Execution (NOT USED)

End of Section 01500.

01505 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

Part 1, General

1. SUBMITTALS

A. Submit the following to the Fort Chaffee Redevelopment Authority prior to beginning any building removal activities.

1. Identification of parties who will handle, transport, and/or dispose of asbestos containing materials, hazardous materials, and solid waste. Verify that each party is qualified, approved, and/or permitted to do so.

2. Individual on the contractor's staff responsible for waste management.

3. Types and approximate quantities of materials that will be recovered, salvaged, recycled, or otherwise diverted from the landfill.

4. Types and approximate quantities of materials that will be land filled or incinerated.

2. MONITORING AND REPORTING

A. Monitor the quantities of waste materials land filled and diverted through recovery, salvage, and/or recycling. Report the following at regular jobsite meetings.

1. Actual quantities compared to the proposed quantities.

2. Opportunities for additional recovery, salvage, or recycling.

3. Conditions that would adversely effect the contractor's ability to recover, salvage, or recycle materials as proposed.

B. At the completion of the buildings' removal, submit the following to the Fort Chaffee Redevelopment Authority.

1. Tipping fees paid at the landfill(s) used for debris disposal, by volume or weight.

2. Total quantity of debris disposed of in a landfill and total landfill cost, by volume or weight.

3. Total quantity of material recovered, salvaged, recycled, or otherwise diverted from the landfill, by volume or weight.

4. Net savings determined by subtracting contractor program management cost and the cost of salvage, deconstruction, separating, processing, and recycling from revenue from the following.

a) Sale of salvaged or recycled materials.

b) Estimated value of recovered or salvaged materials removed by or donated to others.

c) Cost avoidance due to diversion of solid waste from the landfill.

Part 2, Products (NOT USED)

Part 3, Execution

1. MATERIALS MANAGEMENT

1.1. Collect, separate, and make available for pickup office waste and household-type waste generated by the contractor's field office and the workforce. Maintain receptacles in a neat and orderly fashion, label receptacles, and protect recyclable materials from commingling and contamination by garbage and non-salvageable debris.

1.2. Process and store recovered, salvaged, and recycled materials in a neat and orderly fashion. Protect salvaged materials from commingling and contamination by garbage and non-salvageable debris. Protect materials from physical and environmental damage which can reduce their usefulness and value.

1.3. Collect oil, lubricants, and other used petroleum products from construction equipment and vehicles. Prevent commingling of petroleum products by posting, supervision, and/or physical protection.

2. POLICING AND CLEAN-UP. As part of the daily policing and clean-up activities collect reusable, returnable, salvageable, and recyclable materials and deposit them in the appropriate receptacles.

End of Section 01500.

01560 ENVIRONMENTAL PROTECTION

Part 1, General

1. REFERENCES:

Regulation 18,	Arkansas Air Pollution Control Code, Arkansas Department of Environmental Quality
Regulation 22	Solid Waste Management. Arkansas Depart of Environmental Quality
40 CFR 122.26	National Pollutant Discharge Elimination System (NPDES)

Part 2, Products (NOT USED)

Part 3, Execution

1. GENERAL

A. Perform all work in such a manner as to minimize the pollution of air, water, or land and, within reasonable limits control noise and the disposal of solid waste materials and other pollutants.

2. PROTECTION OF LAND AREAS

A. Preserve the land outside the limits of the Hospital Complex in its present condition. Confine activities to the areas specifically assigned for the contractor's use in the site plans and specifications. No other areas of the Fort Chaffee property shall be used by the contractor without written consent of the Fort Chaffee Redevelopment Authority.

3. WASTE DISPOSAL

A. Dispose of all materials not salvaged or recycled in a landfill permitted by the Arkansas Department of Environmental Quality as a Class 1 or Class landfill as defined in Regulation 22: Solid Waste Management. If a landfill outside of the State of Arkansas is used, that landfill must be similarly permitted by that state's environmental regulatory agency.

4. PROTECTION OF TREES AND SHRUBS

A. Do not deface, injure, destroy, cut, or remove trees or shrubs not previously designated for removal or that do not interfere with performance of the Work.

B. Do not fasten ropes, cables, or guys, or otherwise use trees for anchorage or support for conducting any building removal activities.

C. Prevent physical damage to trees. Provide boards, fences, poles or other means of temporary protection for trees that may possibly be defaced, bruised, injured, or otherwise damaged by the contractor's equipment or other operations.

D. Prevent soil compaction around trees. Provide fences or other means of temporary protection where trees may possibly be subject to soil compaction by presence of construction equipment or repeated vehicular traffic. Locate fences around the tree's drip line wherever possible, but no closer than 5 feet to the tree's trunk.

E. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment or workers, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree pruning compound.

F. Restore as nearly as possible to its original condition any tree scarred or damaged by the contractor's equipment or operations. Coat scars as soon as possible with tree wound dressing. Within the Hospital Complex, remove trees that are designated to remain but have been damaged by the contractor beyond saving. Outside the Hospital Complex, remove trees that have been damaged by the contractor beyond saving, and if so directed by the Fort Chaffee Redevelopment Authority, replace them with a nursery-grown tree of the same species.

5. PROTECTION OF WATER RESOURCES

A. Control the disposal of fuels, oils, bitumen, calcium chloride, acids or harmful materials both on and off the Hospital Complex. Implement measures to prevent chemicals, fuels, oils, greases, bituminous materials, herbicides, and insecticides from entering public waters. Prevent water used in onsite material processing, concrete curing, demolition, concrete cleanup, and other waste waters from reentering stream.

B. Per 40CFR 122.26, obtain a National Pollutant Discharge Elimination System (NPDES) permit for construction from the Arkansas Department of Environmental Quality, Water Division, NPDES Branch. As required for the permit, prepare a storm water pollution prevention plan to identify potential discharges to storm water and to develop appropriate management practices to eliminate these discharges and to limit soil erosion.

6. BURNING

A. Burning and air emissions are regulated by the Arkansas Pollution Control and Ecology Commission Regulation 18, Arkansas Air Pollution Control Code.

7. DUST CONTROL

A. Maintain all excavations, stockpiles, access roads, waste areas, and all other work free from excess dust to a reasonable degree as to avoid causing a hazard or nuisance to the adjacent activities or the general public.

8. EROSION CONTROL

A. Prevent soil erosion to the maximum extent practical. Limit disturbance of the site and exposure of soil to those areas necessary to perform the Work. Protect disturbed areas as quickly as possible after the completion of activities in an area. Provide temporary means of preventing erosion, such as mulching or erosion control blankets, to exposed soil on sloped surfaces.

B. Grade to control surface drainage to control erosion from cuts and fills within the project boundaries and from borrow and spoil areas. Provide silt fences, temporary diversions, sedimentation basins or traps, and similar measures to prevent soil from being carried off the project site by runoff.

C. Provide temporary control measures until permanent drainage facilities are complete and operative, and until exposed surfaces are permanently stabilized by vegetation, mulch, rock cover, or other surface treatment.

End of Section 01560.

01780 CONTRACT CLOSEOUT

Part 1, General

1. SUBMITTALS. Submit the following to the Fort Chaffee Redevelopment Authority as part of the close-out of the contract prior to final payment. **[Photocopies] [Original documents]** are acceptable.

A. Record drawings of the Site.

B. Weight tickets or receipts from all debris delivered to permitted solid waste management units.

C. Receipts or manifests for all hazardous waste shipped off site.

D. Notice of Intent for asbestos removal filed with the Arkansas Department of Environmental Quality, Asbestos / Lead-based Paint Section, if regulated asbestos materials are removed under this contract.

E. Asbestos Waste Shipment records, as required by the Arkansas Department of Environmental Quality, if regulated asbestos materials are removed under this contract.

F. Air monitoring results performed in accordance with 29 CFR 1926 Section 62, and further test results if required.

G. Notice of Intent, Permit, and Notice of Termination submitted for the National Pollution Discharge Elimination System.

H. Results of analyses by the Arkansas Department of Environmental Quality licensed Lead-Based Paint contractor, pursuant to Arkansas Department of Environmental Quality Regulation 25: Arkansas Lead-Based Paint Hazard.

Part 2, Products (NOT USED)

Part 3, Execution (NOT USED)

End of Section 01780

DIVISION 02, SITEWORK

02220 DEMOLITION / BUILDING REMOVAL

Part 1, General

1. REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

29 CFR 1926	Occupational Safety and Health Administration, Safety and Health Regulations for Construction
40 CFR 745	Environmental Protection Agency, Lead-based paint poisoning prevention in certain residential structures
Regulation 18	Arkansas Department of Environmental Quality, Arkansas Air Pollution Control Code
Regulation 21	Arkansas Department of Environmental Quality, Arkansas Asbestos Abatement Regulation
Regulation 22	Arkansas Department of Environmental Quality, Solid Waste Management
Regulation 23	Arkansas Department of Environmental Quality, Hazardous Waste Management
Regulation 25	Arkansas Department of Environmental Quality, Lead-Based Paint Hazard

2. TESTS

A. USEPA Proposed Rule published 3 June 1998, 63FR0353, to be codified as 40 CFR 745, Subpart D.

3. SUBMITTALS

A. Test results showing the concentration of lead (Pb) in soil.

B. Results of air monitoring conducted in accordance with 29 CFR 1926 Section 62, and further monitoring and tests if required.

C. Upon request of the Fort Chaffee Redevelopment Authority any time throughout the performance of the Work, submit the records of all materials' disposition, including copies of manifests, origin, disposal forms, bills of lading, and tickets and receipts verifying handling and transport of materials by approved methods and disposal of debris in the appropriately permitted landfill facility or solid waste management unit.

4. DISPOSITION OF MATERIALS

A. Salvageable Materials:

1. The contractor is encouraged to salvage materials for reuse, resale, and recycling to the maximum extent possible. All revenues from salvaged materials shall accrue to the contractor. All savings in landfill fees resulting from waste diversion shall accrue to the contractor.

2. Store materials removed from the buildings for salvage or reuse within the areas designated on the site plan, or in buildings designated by the Fort Chaffee Redevelopment Authority. Materials may be sold to salvage outlets and the general public on site.

B. Historic items: Historic items and cultural artifacts shall remain the property of the Fort Chaffee Redevelopment Authority. If any such items are encountered, remove and store them in a manner to prevent damage. Notify the Fort Chaffee Redevelopment Authority immediately upon their removal.

C. Debris:

1. Burning debris is subject to the restrictions of the Arkansas Pollution Control and Ecology Commission Regulation 18, Arkansas Air Pollution Control Code.

2. Dispose of solid waste materials for which there is no reuse or salvage value in a permitted solid waste management unit, as described in 01560, Environmental Protection.

5. USE OF EXPLOSIVES

A. Use of explosives will not be permitted.

Part 2, Products (NOT APPLICABLE)

Part 3, Execution

1. DESCRIPTION OF WORK

A. Remove the following:

1. All wood frame buildings and connecting walkways.

2. All reinforced concrete and masonry foundations to **[grade] [a level of ____ below finish grade]**.

3. Steam plant, including all boiler, piping, and mechanical equipment.

4. All overhead electrical utilities.

5. All water, sanitary, gas, and steam utilities to **[grade] [a level of ____ below finish grade]**.

6. All other above ground ancillary structures and site appurtenances.

B. Cap water supply lines where disconnected at the buildings to prevent infiltration and contamination of potable water service.

C. Remove only those trees and shrubs that interfere with building removal equipment and activities.

D. Fill excavations and grade to drain.

E. Seed or sod disturbed areas of the site.

F. The following may remain in place:

1. Trees and shrubs that do not interfere with building or utility removal activities.

2. Streets, roads, hardstands, sidewalks, and other paving nominally at grade.

3. Building first floor slabs where the slab surface is nominally flush with the adjacent grade.

4. Foundations below grade.

5. Water, sanitary, gas, and steam utilities below grade.

6. Culverts and drainage structures.

G. Upon the buildings' removal, grading, and seeding, the concentration of lead in the soil shall be within the threshold acceptable for residential occupancy, in accordance with USEPA Proposed Rule published 3 June 1998, 63FR30353, to be codified as 40 CFR 745, Subpart D.

2. HAZARDOUS MATERIALS

A. Pole mounted electrical transformers do not contain PCB.

B. Thermostats and fluorescent tubes are likely to contain Mercury (Hg); fluorescent fixture ballasts are likely to contain PCBs. Remove and dispose of hazardous materials in accordance with Arkansas Department of Environmental Quality Regulation 23: Hazardous Waste Management.

3. LEAD BASED PAINT

A. All paint on building surfaces is presumed to be lead based.

B. Comply with 29 CFR 1926 Section 62, Lead Based Paint.

4. DUST CONTROL

A. Control dust to prevent the creation of a nuisance in areas adjacent to the site. Use of water will not be permitted when it will result in the contamination of runoff, excessive runoff leaving the project site, safety hazard, or other objectionable conditions.

5. PROTECTION

A. Personnel:

1. During demolition, continuously evaluate the condition of the structures being removed and take immediate action to protect all personnel working in and around the building(s) being removed. No area, section, or component of floors, roofs, walls, columns, pilasters, or other structural element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while personnel perform work in the immediate area.

2. Structural components that are designed and constructed to stand without lateral bracing may be allowed to remain standing without additional bracing, shoring, or lateral support until removed. Ensure no

unstable elements are left unsupported. Place and secure bracing, shoring, or lateral support as required as a result of any cutting, removal, or demolition work.

B. Trees: Protect trees within the project site that may be damaged by building removal activities and equipment with a 6 foot high fence. Secure the fence a minimum of 5 feet from the trunk of individual trees or follow the outer perimeter of branches for clusters of trees.

6. ASBESTOS CONTAINING MATERIALS

A. If material is discovered that is suspected to contain asbestos, immediately stop all work on the building in which the suspected material was found. Immediately notify the Fort Chaffee Redevelopment Association.

1. Identify the suspected material. Inspection and identification of asbestos containing material shall be performed by an asbestos contractor licensed by the State of Arkansas.

2. If the suspected material is a Regulated Asbestos Containing Material, remove and dispose of it in accordance with Regulation 21: Arkansas Asbestos Abatement Regulation, Section 11, and Regulation 22: Solid Waste Management, Section 702.

7. FILLING AND GRADING

A. Backfill all holes and excavations resulting from removing foundations and utilities. Fill holes in lifts of no greater than 3 feet and compact each lift prior to placement of the next lift.

B. Place a minimum of 8 inches of topsoil on areas disturbed by building and utility removal. The surface shall be free from debris and other obstacles that would hinder planting and mowing. Spread topsoil to be uniform depth and free from surface irregularities. Topsoil shall not be placed when the subsurface is frozen, excessively wet, extremely dry, or otherwise detrimental to proper grading and seeding.

C. Remove sediment, debris, and other obstacles from culverts, swales, and existing drainage courses.

D. Grade to drain. Meet adjacent elevations and slope to direct water to existing drainage patterns.

8. SEEDING

A. Sow Bermuda grass on all exposed topsoil. Perform seeding operations only when beneficial results can be achieved. Do not seed when drought, excessive moisture, or other adverse conditions prevail.

1. Rework excessively compacted topsoil prior to seeding.

2. Uniformly spread hay or straw mulch over seeded areas at the rate of 2 tons per acre. Apply mulch on the same day as the seed is applied. Provide means of preventing erosion in swales or culverts where topsoil is exposed until the seeded turf is established.

3. Water seeded areas immediately within the workday on which the seed and mulch is spread. Avoid puddling and erosion. Do not drive water trucks on freshly seeded areas. Water to supplement rainfall for a period of **[** ___ **]** days after seeding has been completed.

B. Alternatively, hydroseed all exposed topsoil with Bermuda grass. Follow manufacturer's instructions regarding distribution, mulch content, and watering. Seed shall not remain in the hydroseed slurry more than 24 hours prior to application.

9. CLEAN UP

A. Remove all debris and rubbish upon completion of the Work. Remove and transport debris in a manner that prevents spillage on streets and adjacent areas. Conform to the prevailing local regulations regarding hauling and disposal shall apply.

End of Section 02220.

APPENDIX A. BUILDING DESCRIPTION.

The following provides a general description of the hospital buildings' construction. This description is provided for information only. Proposers are responsible for determining contents and quantities. All dimensions are approximate.

General:

Scope: 149 buildings with a total building area of roughly 391,000 square feet. Wood framed covered walkways connect the buildings.

Construction: Single story wood frame, with two exceptions.

Building 3632, Patient Recreation: 13,111 SF two story wood frame building.

Building 3670, Boiler House: 6,072 SF structural steel frame building with corrugated metal roof and siding. The boilers remain in place.

Overall dimensions: Buildings are generally rectangular in plan, 25 feet to 46 feet wide by 90 feet to 150 long. Dimensions and floor area of each building appear on the Detailed Site Plan Building Use Map Area I.

Substructure:

Buildings are supported by 12-inch square reinforced concrete piers and brick masonry piers. Most buildings have three or four rows of piers, spaced at 10 to 12 feet.

Some buildings are supported with brick masonry perimeter foundations.

Shell:

Floors are framed with 2X10 or 2X12 joists, spaced at 12 to 24 inches. Floor deck is 1-inch board and subfloor is plywood. Beams are built-up members consisting of two or three 2X10s or 2X12s. Mess facilities have a concrete topping on the floor deck. Floor framing is generally unpainted.

Exterior walls are framed with 2X4 or 2X6 studs spaced at 24 inches. Eave heights are 8 to 10 feet. Siding is 1-inch clapboard. Exterior windows and doors remain in the buildings. Siding is painted. Wall framing is generally unpainted.

Roofs are framed with 2X8 rafters and ceiling joists, or trusses fabricated with 2X8s. Framing members are spaced at 24 inches. Mess facilities have roof trusses fabricated with 3X8 members. Roof deck is 1-inch board. Roofing is asphalt shingle. Roof framing is generally unpainted.

Interior Construction:

Partitioning is minimal in most buildings. Partitions are framed with 2X4 studs spaced at 24 inches.

Interior wall finishes are generally 1-inch board applied to one side of the partition. Mess facilities have gypsum wallboard wall and ceiling finishes. Most partitioning is painted.

Services:

Plumbing: Plumbing fixtures and distribution remain in the buildings. Water and sanitary services are inactive within the buildings.

HVAC: Steam radiators and distribution remain in the buildings. Above ground steam mains have been removed.

Gas: Gas distribution is present in some buildings. Where present, gas distribution remains. Gas service is inactive within the buildings.

Electrical: Electrical fixtures, controls, and distribution remain in the buildings. Electrical service is inactive within the buildings.

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14. ABSTRACT

In 1995 the Defense Base Realignment and Closure (BRAC) Commission recommended the permanent closure of Fort Chaffee, AR, and the installation was closed in September 1997. Subsequently, the Fort Chaffee Redevelopment Authority (FCRA) was established to develop a set of recommendations for reutilization and development of the remaining property, including removal or disposal of more than 600 World War II-era temporary wood frame buildings comprising about 2 million square feet of floor space.

This report summarizes a study prepared by the Construction Engineering Research Laboratory (CERL), an element of the U.S. Army Engineer Research and Development Center (ERDC), addressing various alternatives for removing the buildings as quickly and economically as feasible: specifically, demolition of all buildings and disposal of debris in the municipal landfill; demolition of all buildings and disposal of debris by incineration; and supplementary procedures for reducing the cost and adverse environmental effects of the demolition. Cost estimates were developed and recommendations are provided.

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